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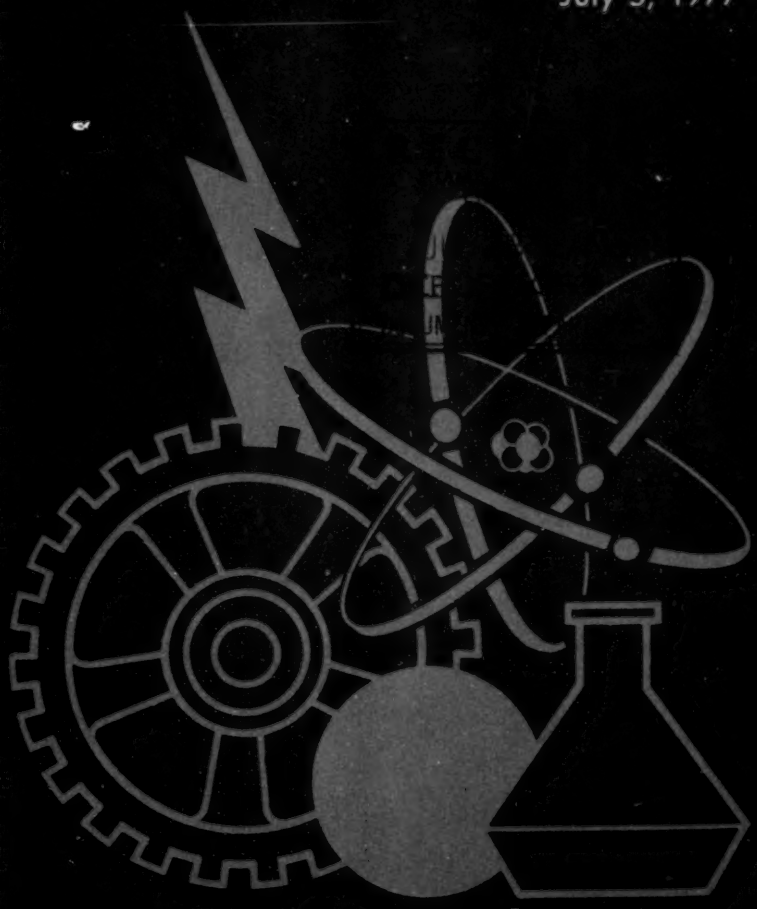
PATENTS

July 5, 1977



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

July 5, 1977 Volume 960 Number 1

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PATENT AND TRADEMARK OFFICE NOTICES

Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before July 22, 1977.

Calvetti, Frederick F. V., 3921 Watson Place, NW., Washington, D.C. 20016

Drezin, Norman A., 783 Kimberly Ct., West Gaithersburg, Md. 20760

Heald, Randall M., 1825 Barbee St., McLean, Va. 22101

Langsam, Andrew S., 3201 Landover St., Alexandria, Va. 22305

Marquette, Darrell F., 12304–B Inletridge, Maryland Heights, Mo. 63043

LUTRELLE F. PARKER,
Deputy Commissioner of Patents and Trademarks, and Chairman, Committe on Enrollment.

Deposit of Computer Program Listings

[37 CFR Part 1]

Notice of Proposed Rulemaking

AGENCY: Patent and Trademark Office, Commerce.

ACTION: Proposed Rule.

SUMMARY: This proposed rule would amend the rules of practice to provide special procedures for presentation of computer program listings in patent applications. This proposal would reduce the present burden of presenting such listings on paper and would also reduce expenses for both the patent applicant and the Patent and Trademark Office.

DATES: Comments must be received on or before: September 13, 1977. Hearing: September 13, 1977, beginning at 9:30 a.m.

ADDRESSES: Send comments to: Commissioner of Patents and Trademarks, Washington, D.C. 20231. The hearing will be held in Room 11C24 of Building 3, Crystal Plaza, at 2021 Jefferson Davis Highway, Arlington, Virginia. Written comments and transcript of hearing will be available for public inspection in Room 11E10 of Building 3, Crystal Plaza, at 2021 Jefferson Davis Highway, Arlington, Virginia.

FOR FURTHER INFORMATION CONTACT: Mr. Louis O. Maassel by telephone at (703) 557–3070, or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

SUPPLEMENTARY INFORMATION: Notice is hereby given that, pursuant to the authority contained in section 6 of the Act of July 19, 1952, as amended (66 Stat. 793; 85 Stat. 364; 88 Stat. 1949; 35 U.S.C. 6 as amended), the Patent and Trademark Office proposes to amend Title 37 of the Code of Federal Regulations by amending Sections 1.21 and 1.77 and by adding a new Section 1.96. This proposal has been reviewed pursuant to E.O. 11821 and OMB Circular A–107 and determined to have no major inflationary impact.

The purpose of the proposed rule change is to provide suitable procedures for presenting computer program listings where such listings are submitted with applications for patent to fulfill the disclosure requirements under 35 U.S.C. 112.

This proposal does not in any way imply that the Patent and Trademark Office considers computer programs per se to be patentable subject matter.

The provisions of 37 CFR Sections 1.52 and 1.84 were developed for and are suitable for the specification and drawings of most patent applications. However, when lengthy computer program listings must be included in order to provide a complete disclosure, their presentation in the conventional manner can become burdensome.

The cost of printing long computer programs or routines in patent documents is very expensive to the Office. The issue fees for the applicant, which are based on the number of pages or sheets, are correspondingly high.

Proposed new Section 1.96 sets forth alternative methods for presentation of such listings. Under paragraph (a), relatively short computer program listings (10 printout pages or less) will be printed as part of the patent. Paragraph (b) provides for submitting computer program listings which are 51 or more paper pages in length in the form of microfiche as an appendix. Computer program listings 11–50 pages in length may be submitted under the provisions of either paragraphs (a) or (b). Appendices on microfiche will not be printed in the patent but will become publicly available on the date the patent is issued. After patenting, the appendix will be prior art under 35 U.S.C. 102(e) as of the filing date of the application with which it was filed. Various incorporations by reference have been approved by the courts in *General Electric Company* v. *Brenner*, 159 USPQ 335; In re Hawkins, 179 USPQ 157, and In re Argoudelis et al., 168 USPQ 99.

Copies of publicly available computer program listing appendices may be purchased either as microfiche (148 mm x 105 mm card) at $1.00 per microfiche or as printed out on paper copy at 30¢ per page.

The micrographic standards referred to in proposed Section 1.96(b)(2) may be obtained from either the National Micrographic Association, 8728 Colesville Road, Silver Spring, Maryland 20910 or the American National Standards Institute, 1430 Broadway, New York, New York, 10018.

1. Section 1.21 is proposed to be amended by adding a new paragraph (1) to read as follows:

Section 1.21. *Patent and miscellaneous fees and charges.*

* * * * *

(1) The fee for obtaining a microfiche copy, per microfiche ---------- $1.00

* * * * *

2. Section 1.77 is proposed to be amended by revising paragraph (c) to read as follows:

Section 1.77 *Arrangement of application.*

* * * * *

(c) (1) Cross-reference to related applications, if any.
(2) Reference to material incorporated by reference, if any. (See Sections 1.96(b) and (c)).

* * * * *

3. A new Section 1.96 is proposed to be added which reads as follows:

Section 1.96 *Submission of computer program listings.*

Computer program listings may be submitted in the following forms:

(a) *As part of application which is to appear in the patent.* If the computer program listing is contained on 10 printout pages or less, it may be submitted either as drawings or as part of the specification.

(1) *Drawings.* The listing may be submitted in the manner and complying with the requirements for drawings as provided in Section 1.84. At least one figure numeral is required on each sheet of drawing.

(2) *Specification.*

(i) The listing may be submitted as part of the specification in accordance with the provisions of Section 1.52, at the end of the description but before the claims.

(ii) The listing may be submitted as part of the specification in the form of computer printout sheets commonly (11 by 14 inches in size) for use as "camera ready copy" when a patent is subsequently printed. Such computer printout sheets must be original copies from the computer with dark solid black letters, on white, unshaded and unlined paper, the printing on each sheet must be limited to an area 9 inches high by 11 inches wide, and the sheets should be submited in a protective cover. When printed in patents, such computer printout sheets will appear at the end of the description but before the claims and will be reduced about ½ in size with two printout sheets being printed as one patent specification page. Any corrections must be made by way of substitute sheets.

(b) *As an appendix which will not be printed.* If a computer program listing printout is more than 51 pages long, applicants must submit such listing in the form of microfiche, referred to in the specifications. The microfiche filed with a patent application is referred to as an appendix. The microfiche appendix will not be part of the printed patent. Reference in the application to the appendix should be made at the location indicated in Section 1.77(c).

(1) *Availability of appendix.* Such computer program listings on microfiche will be available to the public, and paper or microfiche copies will be available for purchase, after a patent is granted based on such an application. Any corrections must be made by way of revised microfiche.

(2) *Submission requirements.* Computer-generated information submitted as an appendix to an application for patent shall be in the form of microfiche in accordance with the standards set forth in National Micrographics Association (NMA) Standards—

MS1—Quality Standards for Computer Output Microfilm

MS2 (ANSI PH 5.18-1976)—Format and Coding Standards for Computer Output Microfilm

MS5 (ANSI PH 5.9-1975)—Microfiche of Documents

ANSI PH 2.19-1959—"Diffuse Transmission Density"—except as modified or clarified below:

(i) Film submitted shall be first generation (camera film) negative appearing microfiche (with emulsion on the back side of the film when viewed with the images right reading).

(ii) Either Computer-Output-Microfilm (COM) output or copies of photographed paper copy may be submitted. In the former case, NMA standards MS1 and MS2 apply; in the latter case, standard MS5 applies.

(iii) Reduction ratio of microfiche submitted should be 24:1 or a similar ratio where variation from said ratio is required in order to fit the documents into the image area of the microfiche format used.

(iv) Film submitted shall have a thickness of at least .005 inches (0.13 mm) and not more than .009 inches (0.23 mm) for either cellulose acetate base or polyester base type.

(v) Both microfiche formats A1 (98 frames, 14 columns x 7 rows) and A3 (63 frames, 9 columns x 7 rows) which are described in NMA standard MS2 (A1 is also described in MS5) are acceptable for use in preparation of microfiche submitted.

(vi) At least the left-most ⅛ (50 mm x 12 mm) of the header of each microfiche submitted shall be clear or positive appearing so that the Patent and Trademark Office can apply serial number and filing date thereto in an eye-readable form. The middle portion of the header shall be used by applicant to apply an eye-readable application title together with inventor's name and any other bibliographic information the applicant sees fit to include. The final right-hand portion of the microfiche shall contain sequence information for the microfiche such as 1 of 4, 2 of 4, etc.

(vii) Additional requirements which apply specifically to microfiche of filmed paper copy or COM microfiche:

(a) Microfiche of filmed paper copy.

(1) The first frame of each microfiche submitted shall contain a standard NBS Microcopy Resolution Test Chart (No. 1010A).

(2) The second frame of each microfiche submitted must contain a fully descriptive title.

(3) The pages appearing on the microfiche frames should be consecutively numbered.

(4) Pagination of the microfiche frames shall be left to right and from top to bottom.

(5) At a reduction of 24:1 resolution of the original microfilm shall be at least 120 lines per mm (5.0 target) so that reproduction copies may be expected to comply with provisions of paragraph 7.1.4 of NMA Standard MS5.

(6) Background density of negative-appearing camera master microfiche of filmed paper documents shall be within the range 0.9 to 1.2 and line density should be no greater than 0.08. The density shall be visual diffuse density as measured using the method described in ANSI Standard PH 2.19-1959.

(7) A suitable index should be included on each microfiche.

(b) Microfiche generated by COM.

(1) Background density of negative-appearing COM-generated camera master microfiche shall be within the range of 1.7 to 2.0 and line density should be no greater than 0.2. The density shall be visual diffuse density as described in ANSI PH 2.19-1959.

(2) The first frame of each microfiche submitted shall contain a resolution test frame in conformance with NMA Standard MS1 (3.1.1).

(3) The second frame of each microfiche submitted must contain a fully descriptive title together with any other suitable index or other appropriate information.

(4) The pages appearing on the microfiche frames should be consecutively numbered.

(5) It is preferred that pagination of the microfiche frames be from left to right and top to bottom but the alternative, i.e., from top to bottom and from left to right, is also acceptable.

(c) *Optional use of either paragraph (a) or (b).* If the computer program listing is 11-50 pages long, applicants may utilize either the procedures of paragraph (a) or (b) of this section.

June 1, 1977. C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

Approved June 7, 1977.

JORDAN J. BARUCH,
Assistant Secretary for Science and Technology.

[FR Doc. 77-17030; Filed 6-14-77; 8:45 a.m.]
42 FR 30522, June 15, 1977

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,844,816, O'Brien and Hawker, RADIO NAVIGATION SYSTEMS, **filed** Aug. 26, 1970, United States Court of Claims (District of Columbia) Doc. 299-70, *Decca Limited* v. *The United States*. Claims held valid and infringed, July 9, 1976.

3,012,585, H. C. O'Brien, PIPE COATING WITH FLOWABLE INNER LAYER; **3,211,598**, same, METHODS OF COATING PIPE, **filed** Oct. 15, 1975, D.C., N.D. Ohio (Cleveland) Doc. C75-902, *H. C. Price Company and Plicoflex Inc.* v. *Samuel Moore & Co.* Stipulation and order settling and dismissing action. Notice waived, Feb. 16, 1977.

3,029,109, W. P. Nail, CONTROL OF INFLATABLE ARTICLES, **filed** May 27, 1976, D.C., N.D. Calif. (San Francisco) Doc. C76-1084 SC, *World Products Warehouse Company* v. *Keith W. Reid, Donald Johnson and Air Beds Inc.* Stipulated dismissal, Feb. 25, 1977.

3,030,371, L. A. Walter, PROCESS FOR THE PREPARATION OF D- AND L-ARYL-(2-PYRIDYL)-AMINO ALKANES, **filed** Feb. 18, 1977, D.C.N.J. (Newark) Doc. 77-0351, *Schering Corporation* v. *Premo Pharmaceutical Laboratories, Inc.*

3,057,449, J. E. Thomson, TYPEWRITER, **filed** Feb. 10, 1977, D.C., S.D.N.Y., Doc. 77-C-662, *Western Stamping Corp.* v. *Buddy L. Corp. et al.*

3,211,598. (See 3,012,585.)

3,214,936, L. J. Di Peri, DRY-AIR EVAPORATIVE COOLER, **filed** Feb. 17, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-580-LTL, *Leonard J. Diperi et al.* v. *American Environmental Systems, Inc. et al.*

3,312,124, Meier and Meier, STEERING-WHEEL ASSEMBLY FOR AUTOMOTIVE VEHICLES, **filed** Feb. 24, 1977, D.C., N.D. Tex. (Dallas) Doc. CA3-77-0242-C, *Superior Industries International, Inc.* v. *Superior Industries, Inc.*

3,325,899, M. Staunt, DENTAL HANDPIECE AND COLLET WRENCH THEREFOR; **Reg. No. 1,020,796** (QUIET-AIR), American Hospital Supply Corporation, **filed** Feb. 17, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-572-RF, *American Hospital Supply Corp.* v. *Fleetwood Dental et al.*

3,384,004, Perlman and Perlman, COFFEEMAKER, **filed** May 15, 1972, D.C., S.D. Ill. (Springfield) Doc. S-C-72-90, *Hill-Shaw Company* v. *Bunn-O-Matic Corporation.* Order of dismissal without prejudice, entered, Mar. 3, 1977.

3,398,689, R. W. Allington, APPARATUS PROVIDING A CONSTANT-RATE TWO COMPONENT FLOW STREAM, **filed** Feb. 17, 1977, D.C. Mass. (Boston) Doc. CA77-506-T, *Waters Associates Inc.* v. *Instrumentation Specialties Co.*

3,464,626, Stamps and Neikirk, AGRICULTURAL CHEMICAL APPLICATION PROCESS AND APPARATUS THEREFOR, **filed** Feb. 18, 1977, D.C. Wash. (Spokane) Doc. C-77-53, *Inject-O-Meter Manufacturing Company, Inc.* v. *Agri Systems Division of Calvert Controls.*

3,489,498, Brody and Chaney, FLAME PHOTOMETRIC DETECTOR WITH IMPROVED SPECIFICITY TO SULFUR AND PHOSPHORUS, **filed** Feb. 28, 1977, D.C. Md. (Baltimore) Doc. H77-291, *American Standard Inc.* v. *Meloy Laboratories, Inc. and Monitor Labs, Incorporated.*

3,562,462, E. L. Long, TILT SWITCH WITH FLAT SPRING CENTERING MEANS; **3,674,966,** same, TILT SWITCH WITH ELONGATED SWITCH BLADE MOUNTED ON A TRIANGULAR PIVOT FOR WIPING ACTION, **filed** Feb. 22, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c587, *Cherry Electrical Products Corporation* v. *Controls Company of American Div. of the Singer Co.*

3,588,576, C. J. Kawieckl, SPARK-GAP DEVICE HAVING A THIN CONDUCTIVE LAYER FOR STABILIZING OPERATION, **filed** July 1, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2419, *Joslyn Mfg. & Supply Co.* v. *Reliable Electric Company.* Stipulation to dismiss the above cause without prejudice granted. Feb. 22, 1977.

3,613,353, B. A. Kock, WATCH; **3,685,282,** same, WATCH ESCAPEMENT MECHANISM, **filed** Feb. 25, 1977, D.C., N.D.N.Y. (Utica) Doc. 77-C-941(WK), *Bruce A. Kock* v. *Louis Marx & Company, Inc. et al.*

3,671,934, R. M. Teich, AUTOMOBILE THEFT ALARM FOR DETECTING UNAUTHORIZED ENERGIZATION OF RESISTIVE LOAD, **filed** Aug. 12, 1975, D.C.N.J. (Newark) Doc. 75-1380, *General Automotive Specialty Co., Inc.* v. *On-Guard Corporation of America et al.* Consent judgment for permanent injunction, Aug. 13, 1975.

3,674,966. (See 3,562,462.)

3,774,186, R. B. Enemark, SMOKE DETECTOR FAILURE ALARM; **3,868,184,** A. A. Marsocci, OPTICAL SMOKE DETECTOR WITH LIGHT SCATTERING TEST DEVICE, **filed** Jan. 24, 1977, D.C., C.D. Calif. (Los Angeles), Doc. CV77-290-AAH, *Electro Signal Lab., Inc.* v. *Tire Corp. et al.*

3,685,282. (See 3,613,353.)

3,789,210, Weber, Shroyer and Baker, RECESSED LIGHTED ASSIST BAR, **filed** Feb. 23, 1977, D.C., N.D. Ind. (South Bend) Doc. S77-0030, *Progressive Dynamics, Inc.* v. *Conroth Company.*

3,792,163, S. J. Fudro, EGG DECORATING DEVICE; **Reg. No. 970,678** (DECOREGGER), Spearhead Marketing, Inc., **filed** Mar. 17, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c860. *Spearhead Marketing, Inc.* v. *Toys "R" Us, Inc.* Filed plaintiff's notice of dismissal pursuant to Rule 41(a)(1)(i), Aug. 1, 1975.

3,799,568, R. G. Hager, LUGGAGE TRANSPORT STRUCTURE; **Re. 29,036,** same, **filed** Feb. 11, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-509-MML, *Samsonite Corporation* v. *Robert G. Hager.*

3,816,702, R. E. Green, ELECTRONIC ISOTHERMAL DEVICE, **filed** Jan. 27, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV-77-0336-WMB, *Bio-Dynamics, Inc.* v. *Robert E. Green, doing business as Phenix Company.*

3,818,198, Walker and Maloy, AUTOMATIC DIRECT-READING PHOTOMETER APPARATUS AND METHOD, **filed** Feb. 15, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-524-RMT, *Collmorgen Technologies Corp.* v. *Gamma Scientific Inc. et al.*

3,825,172, C. A. Mollura, TUBULAR FLEXIBLE BAG WITH LAP WELDED ENDS, **filed** Feb. 15, 1977, D.C., C.D. Calif. (Los Angeles) Doc. CV77-532-R, *Carlos A. Mollura* v. *Curtis G. Miller et al.*

3,835,640, A. W. Hughes, Jr., TALKING ALARM CLOCK, **filed** Feb. 25, 1977, D.C., S.D.N.Y., Doc. 77-C-966, *Janex Corporation* v. *Bradley Time et al.*

3,856,347, Bell, Wallace and Winters, CONVERTIBLE AND REVERSIBLE SEAT STRUCTURE, **filed** Feb. 23, 1977, D.C., N.D. Ohio (Toledo) Doc. C77-93, *General Engineering & Mfg. Corp.* v. *Kustom Fit of Ohio, Inc.*

3,868,184. (See 3,774,186.)

3,983,656, D. L. Bain, FISHING LURE, **filed** Dec. 16, 1976, D.C., S.D. Miss. (Jackson) Doc. J76-386(C), *Dewey L. Bain* v. *Action Lures Company, Inc.* Order dismissing cause on motion of plaintiff without prejudice, Feb. 15, 1977.

Re. 29,036. (See 3,799,568.)

D. 238,268, C. Strada, MOTORCYCLE EXHAUST PIPE, **filed** Feb. 25, 1977, D.C., N.D. Ill. (Chicago) Doc. 77c661, *Charles Strada* v. *AMF, Inc.*

Reg. No. 970,678. (See 3,792,163.)

Reg. No. 1,020,796. (See 3,325,899.)

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

No Reissue Filing Notices published in this Issue.

PATENT NOTICES

Certificates of Correction for the Week of July 5, 1977

P.P. 4,042	4,000,483	4,011,529	4,017,309
D. 242,117	4,001,590	4,011,721	4,017,364
D. 242,118	4,001,631	4,011,775	4,017,377
D. 242,119	4,001,651	4,011,791	4,017,409
3,578,252	4,001,913	4,011,991	4,017,438
3,776,938	4,002,259	4,011,993	4,017,652
3,808,935	4,002,943	4,012,561	4,017,702
3,847,599	4,003,084	4,012,570	4,017,804
3,848,981	4,003,185	4,012,784	4,018,040
3,882,607	4,003,199	4,012,825	4,018,097
3,899,697	4,003,621	4,012,964	4,018,101
3,901,181	4,004,324	4,013,103	4,018,169
3,917,657	4,005,035	4,013,324	4,018,294
3,929,069	4,006,023	4,013,918	4,018,314
3,930,291	4,006,164	4,013,965	4,018,370
3,937,838	4,006,307	4,014,015	4,018,393
3,944,359	4,006,413	4,014,235	4,018,412
3,944,360	4,006,507	4,014,323	4,018,425
3,944,785	4,007,231	4,014,326	4,018,428
3,948,607	4,007,290	4,014,402	4,018,516
3,957,993	4,008,071	4,014,499	4,018,542
3,969,702	4,008,172	4,014,603	4,018,624
3,971,720	4,008,185	4,014,774	4,018,626
3,974,516	4,008,298	4,014,812	4,018,849
3,975,526	4,008,577	4,014,890	4,019,013
3,975,720	4,009,083	4,014,928	4,019,026
3,977,357	4,009,318	4,015,048	4,019,134
3,978,908	4,009,720	4,015,059	4,019,155
3,978,970	4,009,778	4,015,121	4,019,197
3,979,050	4,009,908	4,015,278	4,019,841
3,981,378	4,010,217	4,015,548	4,019,918
3,981,985	4,010,238	4,015,609	4,020,016
3,982,582	4,010,445	4,015,751	4,020,023
3,984,669	4,010,530	4,015,782	4,020,029
3,985,820	4,010,594	4,015,838	4,020,084
3,986,133	4,010,606	4,015,857	4,020,160
3,988,516	4,010,656	4,016,809	4,020,179
3,991,823	4,010,759	4,016,841	4,020,229
3,993,715	4,010,834	4,016,852	4,020,337
3,995,541	4,010,994	4,017,077	4,021,005
3,997,097	4,011,229	4,017,196	4,021,277
3,997,101	4,011,321	4,017,279	4,021,314
3,999,108	4,011,345	4,017,290	4,021,458

Adverse Decisions in Interferences

In the designated interferences involving the indicated claims of the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 3,594,425, W. H. Brader, Jr., S. B. Cavitt and R. M. Gipson, HYDROFORMYLATION PROCESS, Interference No. 98,461, decided Dec. 9, 1976, claims 1, 2, 3, 6 and 8.

Patent No. 3,735,161, G. D. Perkins and J. R. Colbert, PIEZOELECTRIC TRANSDUCER, Interference No. 98,973, decided Jan. 27, 1977, claims 2, 5–8, 13 and 14.

Patent No. 3,756,984, C. H. J. Klaren, H. Krak and F. Jeanno, EPOXY-IMIDAZOLE ADDUCTS AS CURING AGENTS FOR EPOXY RESINS, Interference No. 99,141, decided Feb. 1, 1977, claims 1 and 4–11.

Patent No. 3,762,866, J. Rayment, D. D. McCordell and C. Parr, TEXTILE FINISHING PROCESSES, Interference No. 99,215, decided Feb. 17, 1977, claims 1, 2, 4 and 5.

Patent No. 3,770,978, W. E. Kluge, MAGNETIC BUBBLE DOMAIN SWITCHING DEVICE, Interference No. 98,708, decided Dec. 29, 1976, claim 1.

Patent No. 3,781,852, E. A. White, and J. H. Bunting, CALCULATOR DISPLAY CIRCUIT, Interference No. 98,950, decided Feb. 25, 1977, claims 1–11.

Patent No. 3,790,839, L. Dietch, RECTANGULAR GRADE BLACK SURROUND SCREEN, Interference No. 98,668, decided Oct. 29, 1976, claims 1–7.

Patent No. 3,804,781, J. D. Colgan, EXTRUDED ALUMINA CATALYST SUPPORTS, Interference No. 99,013, decided Mar. 2, 1977, claims 1 and 3.

Patent No. 3,806,757, S. Saruta, IN-LINE GUN TYPE COLOR TELEVISION PICTURE TUBE APPARATUS, Interference No. 99,381, decided Feb. 16, 1977, claims 1–6.

Patent No. 3,820,903, H. Kindl and V. Met, DEVICE FOR PRODUCING A LIGHT PLANE, Interference No. 98,871, decided Jan. 19, 1977, claims 1–9.

Patent No. 3,824,571, R. B. Clover, Jr. and R. F. Waites, MAGNETIC BUBBLE GENERATION, Interference No. 99,192, decided Mar. 2, 1977, claims 1, 2, 5, 6 and 7.

Patent No. 3,842,184, A. E. Kniepkamp and W. Wangard, MUSICAL INSTRUMENT HAVING AUTOMATIC ARPEGGIO SYSTEM, Interference No. 99,242, decided Mar. 18, 1977, claims 6, 7 and 10.

Patent No. 3,861,417, G. W. Rowe, INSTRUMENT CONSOLE FOR UNDERWATER DIVING APPARATUS, Interference No. 99,147, decided Feb. 17, 1977, claims 2, 3, 17, 19, 20, 21, 22, 24 and 25.

Patent No. 3,866,127, G. A. Demos and D. S. Ruhoff, SELECTIVE AUDIO SIGNAL FREQUENCY MULTIPLIER, Interference No. 99,286, decided Mar. 2, 1977, claims 1–9, and 11–15.

Patent No. 3,867,460, E. J. Corey, REAGENTS FOR THE STEREO SELECTIVE GENERATION OF THE CHIRAL SIDECHAIN CARBINOL UNIT (C–15) IN PROSTAGLANDIN SYNTHESIS, Interference No. 99,382, decided Feb. 17, 1977, claims 1–3.

Patent No. 3,921,638, C. H. Schaar, DIAPER WITH PLEAT SECURING TAPE MEANS, Interference No. 99,332, decided Feb. 17, 1977, claims 1, 2, 3 and 11.

Errata

All reference to Patent No. 4,024,331 to Richard W. Neuzil, et al., of Illinois for Process for Separating a Ketose From an Aldose by Selective Adsorption appearing in the OFFICIAL GAZETTE of May 17, 1977, should be deleted since no patent was granted.

All reference to Patent No. 4,025,816 to Geoffrey Phillip Watts of Arizona for Bargraph Display appearing in the OFFICIAL GAZETTE of May 24, 1977, should be deleted since no patent was granted.

All reference to Patent No. 4,026,745 to Donald M. Hatch, et al. of California for High Temperature Consolidation Process appearing in the OFFICIAL GAZETTE of May 31, 1977, should be deleted since no patent was granted.

All reference to Patent No. 4,031,304 to Richard W. Neuzil, et al. of Illinois for Process for Separating a Ketose From an Aldose by Selective Adsorption appearing in the OFFICIAL GAZETTE of June 21, 1977, should be deleted since no patent was granted.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JUNE 4, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	8-4-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	5-17-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-9-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	8-2-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	1-19-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	5-24-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-4-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	12-27-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	5-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	10-28-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-7-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	11-12-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-6-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	7-12-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures: Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-3-76

Expiration of patents: The patents within the range of numbers indicated below expire during June 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,939,145 to 2,943,326, inclusive
Plant Patents..... Numbers 1,950 to 1,956, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED JULY 5, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T960,001
CULVERT CONSTRUCTION

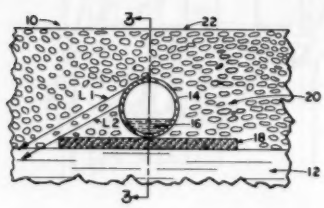
George R. Knight, Box 5-465, College, Alaska 99701

Continuation of Ser. No. 577,577, May 15, 1975, abandoned, which is a continuation of Ser. No. 388,291, Aug. 14, 1973, abandoned, which is a continuation-in-part of Ser. No. 186,240, Oct. 4, 1971, abandoned. This application Apr. 12, 1976, Ser. No. 676,444

Int. Cl.[2] E01F *5/00*

U.S. Cl. 61—16

1 Sheets Drawing. 14 Pages Specification



A culvert construction particularly useful in Arctic regions wherein a permafrost condition typically prevails is provided by a culvert having an insulating base layer between the culvert and the permafrost, preferably wherein the base layer is of greater width than the width of the culvert. Suitable materials for preparing the insulating base layer are synthetic resin foams such as polyurethane and polystyrene. The culvert construction is useful in Arctic regions where a permafrost condition prevails to inhibit culvert sag and culvert icing.

T960,002
FUEL ENRICHMENT CONTROL CIRCUIT FOR AN INTERNAL COMBUSTION ENGINE

Roger A. Moon, 1659 Sheffield Road, Ypsilanti, Mich. 48197

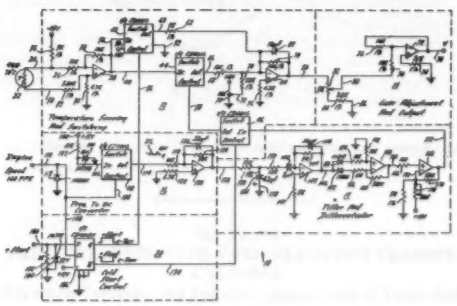
Continuation of Ser. No. 519,156, Oct. 30, 1974, abandoned. This application Mar. 4, 1976, Ser. No. 663,662

Int. Cl.[2] F02B *3/00*

U.S. Cl. 123—32 EA

1 Sheets Drawing. 27 Pages Specification

An internal combustion engine fuel enrichment control circuit which produces an output electrical signal suitable for use in modifying an engine fuel demand electrical signal when the temperature of the engine is below its normal operating temperature. The output signal has a fixed magnitude when the engine is not being cranked or started and the angular acceleration of the engine output shaft is less than a predetermined magnitude. The output electrical signal is proportional to the temperature of the engine when the engine is being cranked or started and also when the angular acceleration of the engine output shaft is greater than the predetermined magnitude. The angular acceleration of the engine is used as an indication of the roughness of operation of the engine. The output electrical signal proportional to engine temperature effects fuel enrichment by the modification of a fuel demand signal that represents engine fuel demand when the engine is at its normal operating temperature. In a preferred embodiment the invention includes an engine temperature sensing and switching circuit, a gain control and output circuit, an engine speed sensing circuit, a filter and differentiator circuit for producing a signal proportional to acceleration of the engine's output shaft and a cold start control circuit.



T960,003
ALLEVIATION OF TISSUE DAMAGE WITH BIS(SUBSTITUTEDPHENYL)MERCAPTOLES

Ian R. Innes, 575 Elm St., and William J. Davidson, 1286 Paterson St., both of Winnipeg, Manitoba, Canada

Filed May 14, 1976, Ser. No. 686,357

Int. Cl.[2] A61K *31/10*

U.S. Cl. 424—337

No Drawing. 25 Pages Specification

Tissue damage alleviative effects are obtained by administration of a bis(substitutedphenyl)mercaptole, such as probucol,

to animals. Tissue protective or recuperative effects are obtained, for example, in cardiac hepatic, uterine and kidney tissue subject to myopathy or histopathological injury by oral or parenteral administration of mercaptole compounds.

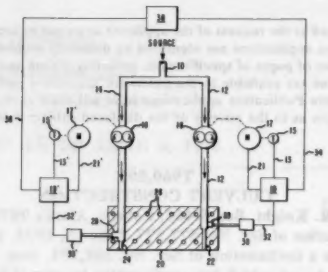
T960,004

APPARATUS FOR CONCURRENT MEASUREMENT OF POLYMER MELT

Garth Emanuel Neville, 307 Brandywine Drive, Old Hickory, Tenn. 37138

Continuation of Ser. No. 469,838, May 14, 1974, abandoned.
This application May 26, 1976, Ser. No. 690,313
Int. Cl.² G01N *11/04*
U.S. Cl. 73—55
1 Sheets Drawing. 12 Pages Specification

A polymer melt's rheological properties are comprehensively described by defining the constants K and *n* in the rheological equation: $T = KG^n$ where T = shear stress and G = shear rate. The constants are determined by a rheometer which divides a molten polymer sample into two streams pumped by positive displacement pumps having identical speed-displacement characteristics past pressure transducers and finally through dissimilar capillaries to atmosphere. The pressure in each line



is regulated at a predetermined level. Pressure and tachometer readings are used to compute the constants K and *n*.

REISSUES

JULY 5, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,287

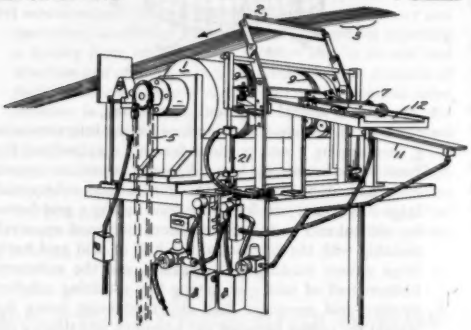
APPARATUS FOR APPLYING HOT MELT SIZE MATERIAL TO TEXTILE YARNS

Walter F. Illman, Greensboro; Robert C. Malpass, High Point, and Delano M. Conklin, Burlington, all of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.

Original No. 3,862,475, dated Jan. 28, 1975, Ser. No. 326,149, Jan. 23, 1973. Application for reissue Feb. 13, 1976, Ser. No. 658,063

Int. Cl.² D06C *29/00*

U.S. Cl. 28—178 **7 Claims**



1. An apparatus for applying sizing material to a plurality of textile strands *of given diameter*, the sizing material initially being *in* solid form, comprising [:]

a roller having a plurality of grooves therein extending circumferentially about the peripheral closed surface thereof, *each of said grooves having a depth greater than the given diameter of a textile strand cooperating therewith*,

means for melting the sizing material and means for applying the sizing material to said roller *from the exterior of said roller* so that sizing is lodged in said grooves [thereof] *of said roller*, and

means for rotating said roller so that sizing in said grooves is applied to textile strands each moving past said roller, and travelling [foc] at least a short distance in a groove *immersed in sizing in said groove* so as to pick up at least a portion of the sizing in that groove.

Re. 29,288

MATERIAL ANALYZING APPARATUS AND METHOD

Robert G. Schilling, Jr., Flushing, N.Y., assignor to Chemical Instruments Corporation, Bayside, N.Y.

Original No. 3,751,977, dated Aug. 14, 1973, Ser. No. 245,574, Apr. 19, 1972. Application for reissue July 17, 1975, Ser. No. 596,589

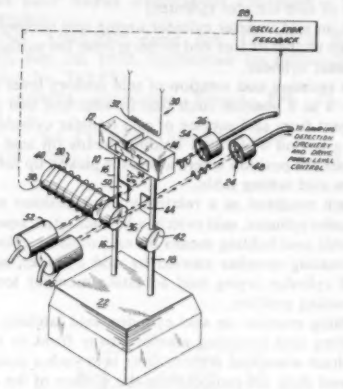
Int. Cl.² G01N *3/32*

U.S. Cl. 73—101 **23 Claims**

22. A method of dynamically analyzing a sample comprising the steps of:

cyclically moving the center of the mass of a sample along an arcuate path lying in a plane, and

simultaneously moving spaced portions of said sample in opposite senses in said plane transverse to said arcuate path,



thereby to create stresses in said sample, and sensing said stresses.

Re. 29,289

PRINTING PRESS WITH VARIABLE SPEED TRANSFER CYLINDER

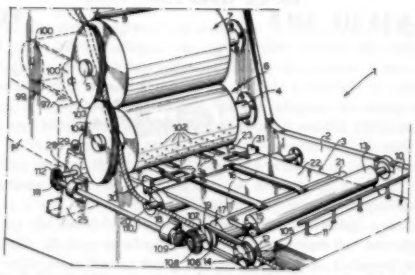
Giancarlo Terzuolo, and Federico Capetti, both of Turin, Italy, assignors to Societa Nebiolo S.p.A., Turin, Italy

Original No. 3,913,478, dated Oct. 21, 1975, Ser. No. 401,298, Sept. 27, 1973. Continuation of Ser. No. 154,105, June 17, 1971, abandoned. Application for reissue Feb. 18, 1976, Ser. No. 659,062

Claims priority, application Italy, June 22, 1970, 69147/70

Int. Cl.² B41F *13/24*

U.S. Cl. 101—232 **9 Claims**



1. In a rotary printing press of the type having a constant speed rotary printing cylinder, a setting table, transport means for transporting sheets of material to be printed by said printing cylinder along said setting table, lateral setting means on said setting table for setting said sheets in lateral registration with respect to said printing cylinder while said sheets are on said setting table, a continuously rotating variable speed transfer cylinder tangential to said printing cylinder and to said table, longitudinal setting means carried by said transfer cylinder for setting the front edge of said sheets in longitudinal registration with respect to said printing cylinder without

stopping said sheets, and holding means carried by said transfer cylinder operable for holding the individual sheet so set in contact with said transfer cylinder, and gripping means on said printing cylinder for gripping said sheet when said holding means reaches the periphery of the printing cylinder, the improvement comprising the diameter of the transfer cylinder being smaller than the diameter of the printing cylinder.

a safety device comprised of at least one sensory lever pivotally mounted at one end on a shaft parallel to the axis of said transfer cylinder,

means on said transfer cylinder urging said sensory lever to rotate so that its free end projects from the surface of said transfer cylinder,

means resisting said rotation of said sensory lever to maintain it in a position such that its said free end does not project from said surface of said transfer cylinder except for a period when said holding means on said cylinder passes the position where a sheet is picked up for transfer from said setting table,

a switch mounted at a relatively fixed position near said transfer cylinder, said switch, when actuated, operating to disable said holding means on said transfer cylinder,

an actuating member carried by said cylinder, means on said cylinder urging said actuating member towards an actuating position.

a latching member on said cylinder, said latching member locking said actuating member away from its actuating position when said sensory lever is in such a position that its end does not project from the surface of the cylinder.

Re. 29,290

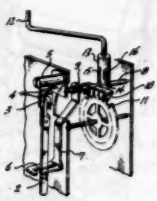
PENDULUM AND ESCAPEMENT ANCHOR RELATIONSHIP INDICATOR AND SETTER

Dale Nofziger, Bothell, Wash., assignor to Ansonia Clock Company, Inc., Lynnwood, Wash.

Original No. 3,874,324, dated Apr. 1, 1975, Ser. No. 439,877, Feb. 6, 1974. Continuation-in-part of Ser. No. 250,783, May 5, 1972, abandoned. Application for reissue July 30, 1975, Ser. No. 600,316

Int. Cl.² G04B *15/14, 17/02*

U.S. Cl. 116—124 R **9 Claims**



1. Clock escapement mechanism comprising a frame, an escape wheel, shaft means mounting said escape wheel and journaled in said frame for rotation about an axis fixed relative to said frame, anchor means including an anchor and an anchor shaft carrying said anchor and journaled in said frame for rotation about an axis stationary with respect to said frame [and fixed relative to said escape wheel axis] , a pendulum connector frictionally mounted on said anchor shaft and angularly adjustable relative to said *anchor* shaft, an indicator arm projecting from and fixedly secured to said anchor shaft, and index means cooperating with said indicator arm for indicating the angular position of said pendulum connector relative to said anchor shaft.

Re. 29,291

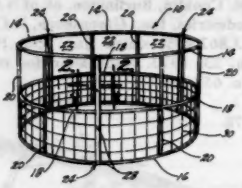
PORTABLE ANIMAL FEED BUNK AND METHOD OF FEEDING STACKED OR BALED HAY

Leonard R. Peak, Lacona, Iowa 50139

Original No. 3,851,624, dated Dec. 3, 1974, Ser. No. 404,673, Oct. 9, 1973. Application for reissue June 4, 1976, Ser. No. 692,805

Int. Cl.² A01K *5/00*

U.S. Cl. 119—60 **6 Claims**



1. A portable animal feed bunk comprising,

a plurality of arcuate frame sections having interconnected [overlapping] end portions forming a cylindrical feed bunk of substantially large diameter, open at opposite ends and along its length for free formed substantially large baled hay, said frame sections having a grid formed by vertical and horizontal members in spaced apart relationship with the substantial top half of said grid having large animal feeding grid openings and the substantial bottom half of said grid having hay retaining relatively smaller grid openings, and said feed bunk being light weight for rolling between use locations and tipping onto said large bales of hay.

Re. 29,292

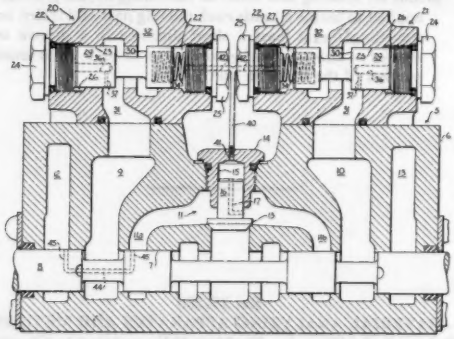
CONTROL VALVE MEANS FOR FLUID MOTORS

Francis H. Tennis, Oconomowoc, Wis., assignor to Sundstrand Corporation, Rockford, Ill.

Original No. 3,730,219, dated May 1, 1973, Ser. No. 145,137, May 20, 1971. Application for reissue Apr. 21, 1975, Ser. No. 570,119

Int. Cl.² F15B *13/04*

U.S. Cl. 137—596 **11 Claims**



15. Valve instrumentalities for governing flow in a service line connectable with a fluid motor of pressure fluid to the motor and return fluid therefrom, said valve instrumentalities being of the type comprising a directional control valve having a service passage for connection with the service line to form a part thereof, fluid supply passage means, return passage means, and a valve element movable from a hold position blocking communication between the service passage and both of said passage means to a pair of operating positions, in one of which the service passage is communicated with the fluid supply passage

means and in the other of which the service passage is communicated with the return passage means, through a range of metering positions at which the valve element restricts flow of fluid between the service passage and a passage means to an extent that decreases with movement of the valve element towards an operating position, said valve instrumentalities comprising:

A. a pressure reducing valve mechanism for said service passage

(1) having a single passageway through which all fluid that flows in said service line must pass,

(2) having a valve member movable in one direction to an open position and movable in the opposite direction to a restricting position throttling flow of fluid through said passageway, said valve member being arranged to be urged in said opposite direction with a force that depends upon pressure of fluid in the service passage,

(3) a chamber separate from said passageway, and

(4) means responsive to pressure of fluid in said chamber and operatively associated with the valve member for imposing a biasing force on said valve member that is in said one direction and of a magnitude that depends upon pressure of fluid in said chamber and is sufficient to maintain the valve member in its open position when fluid pressure in the service passage does not exceed pressure of fluid in said chamber; and

means at all times communicating said chamber with the fluid supply passage means, so that said valve member is held in its open position whenever pressure fluid is flowing from the pressure fluid source to the motor through the service passage.

Re. 29,293

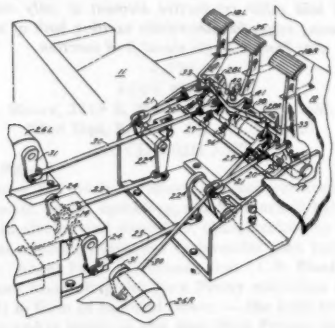
PEDAL ACTUATED STEERING CLUTCH AND BRAKE CONTROLS FOR TRACTORS

Charles C. Ehlke; Donald K. Strohschein, both of Naperville, and John W. Yancey, East Peoria, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Original No. 3,262,525, dated July 26, 1966, Ser. No. 363,241, Apr. 28, 1964. Application for reissue May 20, 1975, Ser. No. 579,284

Int. Cl.² F16D *67/05*

U.S. Cl. 192—13 R **17 Claims**



1. In a tractor which has steering clutches and steering brakes, the combiation comprising: *first and second* actuating members for said clutches and brakes, *a fluid-operated clutch disengaging valve associated with each clutch*, a linkage *arrangement to operate one clutch disengaging valve and* to release one clutch upon actuation of one member and to apply the corresponding brake upon further actuation of said one member, and *a* similar linkage *arrangement* between the other clutch and brake and the other member, *each of said linkage arrangements including a first linkage from each actuating member to the corresponding clutch disengaging valve and a second separate linkage from each actuating member to the corresponding brake*, a third member and means operable upon actuation of said third member to apply both brakes only *and without operating the clutches.*

Re. 29,294

PRESS FOR MOULDING GRAMOPHONE RECORDS OR THE LIKE

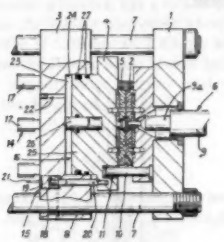
Marcel J. Pierre, Cheptainville, France, assignor to Societe Materiel pour Toutes Applications Plastiques - M.A.P., Paris, France

Original No. 3,969,057, dated July 13, 1976, Ser. No. 548,752, Feb. 10, 1975. Application for reissue Nov. 18, 1976, Ser. No. 743,033

Claims priority, application France, Feb. 21, 1974, 74.05980

Int. Cl.² B29F *1/00*; B29H *3/08*

U.S. Cl. 425—590 **4 Claims**



1. Press for moulding gramophone disc records, comprising: a fixed press platen adapted to carry a first mould element; parallel guide columns fast with the fixed press platen; a movable press platen mounted on and movable relatively to said columns, a movable intermediate platen adapted to carry a second mould element, said first and second mould elements having cavities which together form the shape of a gramophone disc record, the movable press and intermediate platens co-operating one within the other as an arrangement of a piston in a cylinder with the intermediate platen supported wholly by the movable press platen; means including a constant-stroke closing mechanism of the toggle type for moving the movable press platen along the guide columns, between an operative position close to the fixed press platen and an inoperative position remote from the fixed press platen; a circuit for the admission of fluid under pressure between the movable press and intermediate platens to effect relative movement of the piston of said piston and cylinder arrangement out of its cylinder, and a feed system for plastics material in the fluid state capable of introducing under pressure a metered charge of this plastics material between the two mould elements when the movable press platen occupies its operative position and when the said circuit delivers fluid under pressure as aforesaid between the movable press and intermediate platens, said means for moving the movable press platen and the circuit for the admission of fluid under pressure being operable, after the

movable platen has been moved toward the fixed platen by the constant stroke mechanism, to act upon the intermediate platen, on each operation of introduction of plastics material under pressure, in two successive stages, the first of which consists in driving the intermediate platen towards the fixed platen with a resilient force calibrated to a value lower than the opposing force which is produced by the introduction of the plastics material into the mould and which tends to separate the mould elements of the fixed and intermediate platens, and the second of which is a stage of compression with a force sufficient to move the two mould elements one against the other after introduction of the charge of plastics material.

Re. 29,295

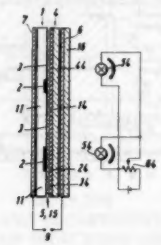
TREATMENT PROCESS

Margaret Lillian Steel, and Frank Holt, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London England

Original No. 3,950,182, dated Apr. 13, 1976, Ser. No. 524,946, Nov. 18, 1974. Application for reissue Oct. 29, 1976, Ser. No. 737,191

Int. Cl.[2] B02C *23/06*

U.S. Cl. 106—308C **23 Claims**



1. A mineral comminution process which comprises comminuting the mineral in the presence of a liquid medium comprising an ionic polysaccharide, *in which the polysaccharide is a cellulose.*

Re. 29,296

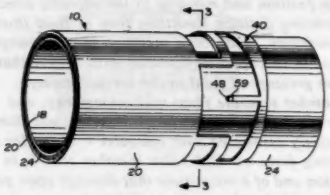
DUAL SLOT MICROSTRIP ANTENNA DEVICE

Jack K. Krutsinger, Boulder; Carl N. Bullai, Longmont, and Robert E. Munson, Boulder, all of Colo., assignors to Ball Brothers Research Corporation, Boulder, Colo.

Original No. 3,810,183, dated May 7, 1974, Ser. No. 99,481, Dec. 18, 1970. Application for reissue July 16, 1975, Ser. No. 596,263

Int. Cl.[2] H01Q *13/10, 1/28*

U.S. Cl. 343—700 MS **7 Claims**



5. A dual slot antenna assembly comprising:

a pair of laterally spaced-apart conductive elements separated with respect to one another by a sheet of dielectric material,

one of said conductive elements being of larger dimensions and underlying the other element and defining an electrical reference or ground surface;

said conductive elements defining a pair of radiation slots between opposing edges of said other element and said reference surface, said radiation slots being longitudinally spaced-apart a predetermined distance approximately equal to one-half wavelength at the anticipated operating frequency of said assembly,

each of which radiation slots emanates radiation therefrom such that the radiation patterns developed are in substantially the same direction;

said radiation slots having a length dimension equal to the entire length of said opposing edges, which length dimension is greater than the spacing between said conductive elements; and

a single electrical signal feed assembly integrally connected with said other conductive element at only one of said opposing edges for electrically exciting both of said radiation slots from a single signal feed junction.

PLANT PATENTS

GRANTED JULY 5, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,069
RUBBER PLANT (FICUS GOLD KING)

Tokuyasu Ito, and Hideo Ikuta, both of Hekinan, Japan, assignors to Cerro Gordo, Inc., Vega Alta, P.R.

Filed Aug. 12, 1976, Ser. No. 713,994
Claims priority, application Japan, Aug. 19, 1975, 50-99798
Int. Cl.² A01H *5/12*
U.S. Cl. Plt.—88 **1 Claim**

1. A new and distinct variety of *Ficus elastica* Roxb. var. *decora* tricolor hort., substantially as herein shown and described, characterized over the known rubber plant having variegated foliage, *Ficus elastica* Roxb. var. *decora* tricolor hort., in that leaves are smaller in size, the leaf blade has an ovate shape with a thick coriaceous texture and exhibits a very narrow dark-green area appearing on the edge of the leaf blade and a light-yellow area appearing at the interior of the leaf blade, the boundary between the dark-green border area and the light-yellow interior area is very distinct; the peripheral edge of the leaf blade is wavy; the internode length is shorter; the rate of growth is lower and, since propagation by using cuttings is difficult, air layering is employed.

4,070
ROSE PLANT

Ralph S. Moore, 2519 E. Noble Ave., Visalia, Calif. 93277

Filed Sept. 1, 1976, Ser. No. 719,607
Int. Cl.² A01H *5/00*
U.S. Cl. Plt.—9 **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, spreading, much branched habit, essentially as illustrated and described, characterized by buds and flowers of a medium lavender or lavender pink color resembling the 'Angel Face' Floribunda rose (U.S. Plant Pat. No. 2,792) and resembling the New Penny miniature rose (not patented) in form of bud and flower — the buds and flowers being somewhat larger in size than New Penny; and further characterized by a plant which is vigorous and compact, said plant being easy to propagate from cuttings, with medium small, disease resistant, semi-glossy, foliage, an abundance of bloom, with flowers borne singly or several to the stem in small clusters.

4,071
CLEAR YELLOW MAY SHOESMITH

Yoshio Kono, 13200 Barbata Road, La Mirada, Calif. 90638

Filed Sept. 29, 1975, Ser. No. 617,525
Int. Cl.² A01H *5/00*
U.S. Cl. Plt.—78 **1 Claim**

1. A new and distinct variety of chrysanthemum plant, substantially as herein shown and descibed, characterized by a yellow flower 12.7 mm to 19.05 mm smaller than the parent May Shoesmith; having a clearer yellow color which is more toward the yellow-green than toward the yellow-orange; exhibiting an absence of a darker yellow; the distal end of the petal shows occasional whiskers; has a two to three day earlier response time than the parent and other known sports of the parent; plant growth is 5.08 cm to 7.62 cm shorter, the leaf surface has a sheen; the flower is less formal incurving; and the individual petals appear more narrow and exhibit greater cupping through the length of the petal.

4,072
PEACH TREE

Hitoshi P. Nakayama, 7420 E. Lincoln, Fowler, Calif. 93625

Filed Aug. 2, 1976, Ser. No. 710,684
Int. Cl.² A01H *5/03*
U.S. Cl. Plt.—43 **1 Claim**

1. The new and distinct variety of peach tree, substantially as shown and described herein, characterized by highly colored, firm, fine grained, yellow-fleshed freestone fruit which reaches maturity a week to 10 days before the peaches of the Red Top variety (unpatented).

4,073
BEGONIA PLANT

Leslie Woodriff, McKinleyville, Calif., assignor to Mikkelsens Inc., Ashtabula, Ohio

Filed June 1, 1976, Ser. No. 691,484
Int. Cl.² A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of begonia plant known by the cultivar name Roulette and particularly characterized as to uniqueness by the combined characteristics of foliage which has an overall ruffled or wavy appearance and which is dark green mottled with yellow-green patches between the veins, and a hairy texture on the margins of the leaves; the leaf petiole often forms a coalesced multi-cylindrical effect at the base of the leaf formed by the fusion of the leaf veins from the two opposite spirals; leaf size of up to 10 cm. wide and up to 8 cm. deep when laid out flat; parted leaf margin with two based lobes that spiral; plant height of upward to 12–15 cm.; very light pink to nearly white flowers, and by its efficient propagation by leaf cuttings.

PATENTS

GRANTED JULY 5, 1977

ERRATA

For CLASS	See PATENT NO.
085–004	4,033,243
085–045	4,033,244
123–117 R	4,033,272
124–017	4,033,313
226–157	4,033,560
297–389	4,033,594
203–027	4,033,617
062–003	4,033,734
062–064	4,033,737
062–158	4,033,738
062–202	4,033,739
062–259	4,033,740
423–024	4,033,764
209–073	4,033,862
250–199	4,033,882
250–231 SE	4,033,883
250–496	4,033,884
250–496	4,033,885
250–491	4,033,904
264–045.9	4,033,929
264–032	4,034,027
260–429 R	4,034,037
260–462 R	4,034,038
260–570 R	4,034,039
260–570.9	4,034,040
260–571	4,034,041
260–576	4,034,042
260–578	4,034,043
260–586 R	4,034,044
260–590 FB	4,034,045
260–607 B	4,034,046
260–610 B	4,034,047
260–621 H	4,034,048
260–658 R	4,034,049
260–622 R	4,034,050
260–652.5 R	4,034,051
260–671 C	4,034,052
260–672 T	4,034,053
219–218	4,034,200
219–222	4,034,201
219–230	4,034,202
219–272	4,034,203
219–368	4,034,204

ERRATA – continued

219–385	4,034,205
219–464	4,034,206
219–517	4,034,207
361–002	4,034,264
361–025	4,034,265
361–042	4,034,266
361–044	4,034,267
361–111	4,034,268
361–079	4,034,269
361–256	4,034,270
361–332	4,034,271
361–025	4,034,280
340–173 LM	4,034,355
340–173 R	4,034,356
340–174 TF	4,034,357
340–174 TF	4,034,358
340–174 TF	4,034,359
340–253 A	4,034,360
340–272	4,034,361
340–347 AD	4,034,362
340–347 P	4,034,363
340–347 NT	4,034,364
340–347 DA	4,034,365
340–347 AD	4,034,366
340–347 AD	4,034,367
340–347 AD	4,034,368
340–052 F	4,034,369
357–068	4,034,399

PATENTS

GRANTED JULY 5, 1977

NOTE—A cross reference listing of applications published under Trial Voluntary Protest Program on January 28, 1975 is located in the back of this Issue. These entries will be in numerical order by document publication number.

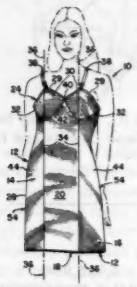
GENERAL AND MECHANICAL

4,032,989

GARMENT LINER

Aubrey Jay, White Plains, and Maurice A. Jacobs, Valley Cottage, both of N.Y., assignors to J. C. Penney Company, Inc., New York, N.Y.

Filed Nov. 8, 1974, Ser. No. 522,318
Int. Cl.² A41B 9/10
U.S. Cl. 2—73 **10 Claims**



1. A form fitting undergarment which comprises a bodice section and a depending skirt section connected thereto, said bodice section including two bust covering portions, each comprising inner and outer bust panels, said skirt portion including at least a front panel and at least a pair of opposed side panels connected to opposite edge portions of said front panel, and a rear panel interconnecting said opposite side panels, said inner bust covering panels, said front panel, and said back panel being formed of a straight-cut material having generally straight cut edge portions, said outer bust panels and said opposed side panels being formed of a biased cut material having generally biased-cut edge portions biasing the corresponding side and bust panels, said bias-cut of said outer bust panels extending in substantially the same direction as the bias-cut of said opposed side panels at least along a portion defined by a generally vertical line extending generally medially of each breast of a wearer and respective front medial portions along the legs, said bust and side panels further extending respectively over side zones of the body along at least a portion of a vertical line extending generally medially of each respective shoulder blade of the wearer and longitudinally along a rear medial portion of each respective leg to form a snugly encompassing relation with the body of a wearer due to the substantially vertical interconnecting edge portions of said panels and the elastic properties exhibited by said bias-cut side and bust panels.

4,032,990

HEAT RESISTANT GLOVE HAVING ADDITIONAL PROTECTIVE PORTION IN GRIPPING AREA

Mayar Richard Mandlman, Bayside, Wis., assignor to Apex Glove Co., Inc., Milwaukee, Wis.

Filed Dec. 3, 1976, Ser. No. 747,376
Int. Cl.² A41D 19/00
U.S. Cl. 2—161 R **7 Claims**

1. An insulated glove having a liner and also having an outer glove into which the liner is assembled, said liner and glove each having an inter-engaging index finger and thumb with a gripping area therebetween, an insulating portion for said gripping area formed of flexible, heat resistant material and having a pocket at each of its ends, said pockets slipped over the index finger and thumb of said liner and said insulating portion covers said liner gripping area, said liner inserted in said glove with said index finger and said thumb of said insulating portion inserted in said index finger and thumb of said

glove and held in assembled relationship between said liner and outer glove.

4,032,991

FACE AND HEAD PROTECTIVE DEVICE

Joseph L. Vandeweghe, Englewood, N.J., assignor to Engleway Corporation, Englewood, N.J.

Filed Jan. 5, 1976, Ser. No. 646,505
Int. Cl.² A42B 1/18
U.S. Cl. 2—173 **8 Claims**

1. A protective device operative to be rendered from a storage condition into an operative condition to afford protection to the wearer against the effects of fire, smoke and noxious fume inhalation; said device in the storage condition comprising; a water-proof envelope enclosing a moistened porous face mask secured thereto, said envelope including an aperture and air-tight closure means operative to air-tight seal said aperture to thereby maintain said face mask in its moistened condition when said device is in said storage condition, whereby removal of said closure means permits access to and withdrawal of said face mask from the interior of said envelope to render said device into the operative condition wherein said envelope is adaptable to be rendered into a head cap.

4,032,992

CONTROLLING DEGREE OF REACTION BY CONTROLLING HEAT INPUT IN CELLULOSE TEXTILE-REACTANT SYSTEMS

Ildo Emil Pensa, Palisades Park, and Robert Otto Rau, Franklin Lakes, both of N.J., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Continuation-in-part of Ser. No. 542,119, April 12, 1966, abandoned, which is a continuation of Ser. No. 402,626, Oct. 8, 1964, abandoned, which is a continuation-in-part of Ser. No. 292,727, June 3, 1963, abandoned. This application Oct. 17, 1969, Ser. No. 867,411
Int. Cl.² D06M 13/28, 15/54, 15/58, 15/64, 15/72
U.S. Cl. 2—243 R **20 Claims**

1. The method of producing a permanently shaped textile

article from a material comprising cellulosic fibers comprising the steps of:

A. shaping a material into a desired configuration, said material comprising cellulosic fibers and which material has been:

1. impregnated with a cellulose cross-linking reagent selected from the group consisting of:

a. reaction products of formaldehyde with carboxamides wherein said reaction products contain 2 or 3 N-methylol groups and methyl ethers thereof;

compounds having the following generic formula:

$$R_1OCH_2CH_2SO_2(QSO_2)_nCH_2CH_2OR_2$$

wherein R_1 and R_2 may be the same or different and are selected from the group consisting of hydrogen and an alkyl radical of up to five carbon atoms; Q is a divalent organic radical selected from the group consisting of aliphatic radicals containing at least three carbon atoms, aromatic radicals and alkylaromatic radicals; and, *n* is 0 or 1; and, said reaction conditions include the presence of an alkaline catalyst;

c. compounds selected from the group consisting of 1,3,5 tris (hydroxypropyl) hexahydro-s-triazine and 1,3,5 tris (methoxypropyl) hexahydro-s-triazine and,

d. tris-1-aziridinyl phosphine oxide; and,

2. heated in an atmosphere in which the relative humidity is less than 100% and in the presence of a catalyst, to a temperature in the range of between about 200° F. to about 1000° F. for a period of time in the range of between about 5 minutes and about 4 seconds during which time period said cross-linking reagent is chemically bonded to said cellulosic material, said time-temperature relationship being such that in the lower temperature range the time period is in the higher time range and in the higher temperature range the time period in the lower time range and under such heating conditions that the maximum heat energy applied to said impregnated material is that heat energy which allows said material to have a maximum dry crease recovery angle increasable by at least 10% by subsequent heating to cure said material, to thereby produce a modified material intermediate; and

B. without further addition of catalysts to said material, heating the shaped material to cure said chemically bonded cross-linking reagent to provide a permanently shaped textile article having at least said increased dry crease recovery angle.

16. A permanently shaped textile article produced in accordance with the method of claim **1.**

4,032,993

BIORESORBABLE SURGICAL ARTICLES

Jean Coquard, Grezieu-La Varenne; Pierre Sédivy, Sceaux; Michel Ruaud, Ternay, and Jean Verrier, Boulogne-sur-Seine, all of France, assignors to Rhone-Poulenc Industries, Paris, France

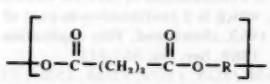
Filed June 25, 1975, Ser. No. 590,284

Claims priority, application France, June 28, 1974, 74.22587

Int. Cl.² A61F *1/24, 1/00;* **A61L** *17/00*

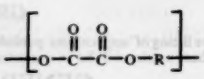
U.S. Cl. 3—1 **30 Claims**

1. A sterile implantable surgical article which is at least partially bioresorbable, and which consists at least partially of a copolyester of succinic acid and oxalic acid possessing recurring units of the general formulae:



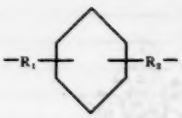
(I)

and



(II)

in which each R radical in the chain, which may be identical or different, represents a linear or branched alkylene radical possessing 2 to 6 carbon atoms, at least 2 of which carbon atoms form part of the polymer chain, a cyclo-alkylene radical possessing 5 to 8 carbon atoms, or a radical of the general formula:



(III)

in which each of R_1 and R_2, which may be identical or different, represents a methylene or ethylene radical.

4,032,994

HIP JOINT PROSTHESIS

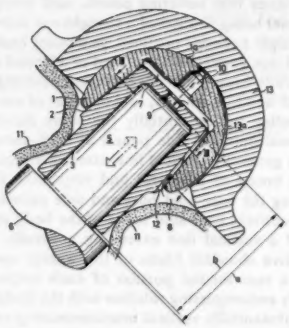
Otto Frey, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 24, 1976, Ser. No. 688,994

Claims priority, application Switzerland, June 3, 1975, 7113/75

Int. Cl.² A61F *1/24*

U.S. Cl. 3—1.912 **9 Claims**



8. A hip joint prosthesis comprising

a pin;

a cup-shaped member rotatably and axially movably mounted on said pin, said member having a sleeve defining a bore surrounding said pin and an end wall facing an end of said pin, said sleeve having an outer conical circumferential surface and said end wall having a passage therethrough communicating with said bore;

a spherical joint head rigidly mounted on said sleeve, said joint head having an interior cone-shaped surface in engagement with said sleeve surface and being spaced from said end wall to define a chamber therebetween, said chamber being in communication with said passage in said end wall; and

at least one groove-like recess in said conical circumferential surface of said sleeve communicating the exterior space around said sleeve and joint head with said chamber.

4,032,995

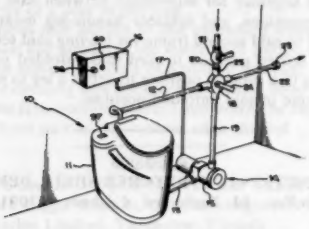
SYSTEM AND METHOD FOR TREATING HUMAN WASTE

James M. Kemper, Sherman Oaks, Calif., assignor to Monogram Industries, Inc., Santa Monica, Calif.

Filed Feb. 23, 1976, Ser. No. 660,645

Int. Cl.² E03D *1/00, 3/00, 5/00*

U.S. Cl. 4—10 **10 Claims**



1. In a treatment system for a toilet having a water inlet in fluid communication therewith for introducing water therein and a holding tank portion at the bottom thereof for receiving human waste deposited in said toilet and a grinder and pump activated by a motor having its inlet operatively connected and in fluid communication with said holding tank portion and its outlet leading to a point remote from said grinder and pump, said system comprising:

valving means operatively connected to both said outlet and the water inlet into said toilet for selectively introducing either water alone from a remote source through said water inlet into said toilet or waste from said grinder and pump either back into said toilet through said water inlet or to said point remote from said grinder and pump; and

sensing means associated with said motor activated grinder and pump for sensing the presence of a tablet of a predetermined size, shape and weight thereby activating said motor to drive said grinder and pump.

4,032,996

SEALING APPARATUS FOR TOILET

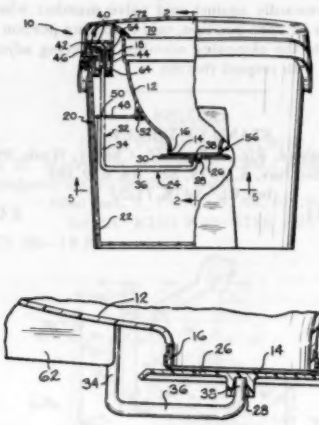
Frak T. Sargent, and John M. Antos, both of Ann Arbor, Mich., assignors to Thetford Corporation, Ann Arbor, Mich.

Filed Aug. 4, 1976, Ser. No. 711,434

Int. Cl.² E03D *5/01, 5/012, 5/09*

U.S. Cl. 4—17 **14 Claims**

1. Toilet apparatus comprising a bowl having at its bottom a discharge outlet, a housing supporting said bowl, and a sealing mechanism for closing and opening said bowl outlet, said sealing mechanism comprising a blade of larger area than said bowl outlet, a crank having a vertical shaft mounted in said housing for rotary movement about its vertical axis, a crank arm radiating from said shaft and supporting said blade, actuating means connected to said shaft at a location accessible from the outside of said housing for rotating said shaft between a first position wherein said blade is under said bowl outlet for closing the bottom of the bowl and a second position wherein said blade is at one side of said bowl outlet, a seal member mounted in sealing relationship to the bottom of said bowl around said outlet, and spring means urging said shaft axially upward so that the blade will be seated in sealing relationship against said seal member when the blade is in its closed position.



4,032,997

FLUSH TOILET ACCESSORY

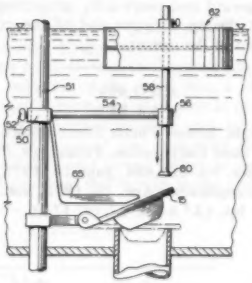
Clarence F. Phripp, R.R. No. 1, St. Clements, Ontario, Canada (N0B 2M0), and Norman R. Preston, 169 Ross Ave., Kitchener, Ontario, Canada (N2A 1V5)

Filed Sept. 23, 1975, Ser. No. 615,923

Claims priority, application United Kingdom, Sept. 30, 1974, 42437/74

Int. Cl.² E03D *1/34, 3/12*

U.S. Cl. 4—52 **7 Claims**



1. A flush regulator assembly for use in a toilet flush tank for regulating the outflow therefrom through an outlet pipe, the assembly comprising:

a mounting portion,

first means supporting the mounting portion from another part of the flush tank such that the mounting portion can move between upper and lower positions in the flush tank,

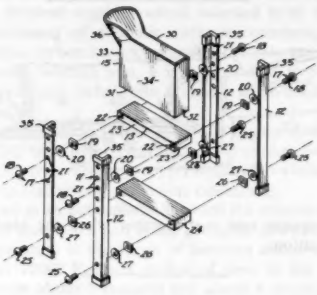
upwardly open water chamber means connected to the mounting portion,

downwardly open air chamber means connected to the mounting portion,

and second means enabling the mounting portion to exert a premature downward push on a valve member adapted to open and close said outlet pipe, said second means in-

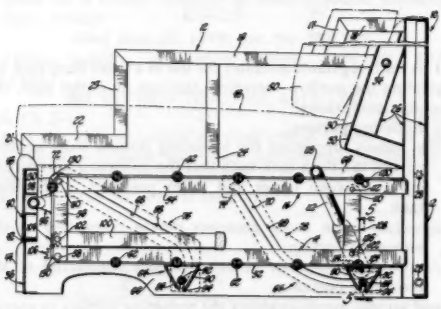
cluding an elongated member oriented substantially vertically and adapted to slide freely up and down while constrained against lateral movement within the flush tank, the elongated member having a lower end adapted to push downwardly against said valve member when the latter is in its open position, said mounting portion being attached to the elongated member and being adjustable vertically with respect thereto.

4,032,998
STAND UP TOILET
Robert W. England, Rte. 3, Box 356, Cheney, Wash. 99041
Filed Nov. 6, 1975, Ser. No. 629,385
Int. Cl.² A47K *11/02*
U.S. Cl. 4—111 **5 Claims**



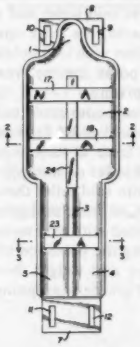
1. A stand up toilet, comprising:
a plurality of upright legs;
a horizontal support releasably interconnecting the legs and located downward of upper leg ends so that portions of the legs project upwardly from the support;
a container of rectangular cross section having an open upper end and a closed lower end adapted to be loosely received between portions of the legs extending above the support with the closed lower end loosely resting against the support; and
wherein an upward and rearwardly projecting deflector is provided at the open upper end of the container at a rearward end of the opening.

4,032,999
SOFA BED
William L. Pringle, Grosse Pointe Shores, Mich., assignor to United States Steel Corporation, Pittsburgh, Pa.
Division of Ser. No. 585,684, June 10, 1975, Pat. No. 3,975,783. This application Apr. 16, 1976, Ser. No. 677,692
Int. Cl.² A47C *17/14, 17/06*
U.S. Cl. 5—14 **5 Claims**



1. A furniture assembly for movement between a sitting configuration and a bed configuration comprising; support frame means, bed frame means movable between a folded position and an unfolded position, said bed frame means being in said folded position when in said sitting configuration and in said unfolded position when in said bed configuration, means interconnecting said bed frame means and said support frame means for allowing movement of said bed frame means relative to said support frame means, said bed frame means including at least first and second mattress frames pivotally connected together for movement between said folded and unfolded positions, and foldable handle-leg means pivotally connected to said second frame for moving said second frame from said folded position toward said unfolded position and for moving to a support position to act as a leg to support said second frame in said unfolded position.

4,033,000
FUNCTIONAL STRETCHER SHELL DEVICE
André Bonifay, 14 Boulevard d'Athens, 13001 Marseille, France
Filed Nov. 5, 1974, Ser. No. 520,989
Int. Cl.² A61G *1/00*
U.S. Cl. 5—82 R **2 Claims**



1. A stretcher, especially for patients requiring orthopaedic retention of lesions of one or more of the limbs, head, spine and torso; comprising a trough-like integral shell of moulded plastic material having a depth suitable to receive the body within its depth and having its wall shaped to define in order from one end of said shell to the other a compartment for the head, and a compartment for the torso and a compartment for the legs, said shell including a longitudinal partition wall extending substantially centrally along and within the leg compartment so as to sub-divide said compartment into individual leg-receiving zones, said shell having in its wall at said torso compartment and at said leg compartment at least one pair of patient attachment means, said head compartment, said torso compartment and said leg compartment of said shell following the outlines of the human body on the sides and back of the body, and being of dimensions standardized to the current norms of the most frequently encountered sizes, the underside of said shell comprising stiffening support means and including means for the handling and transport of the stretcher.

4,033,001
SLEEPING BAG
Margaret Jean Kern, Port Colborne, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest
Filed Apr. 26, 1976, Ser. No. 680,285
Int. Cl.² A47G *9/00*
U.S. Cl. 5—343 **2 Claims**

1. A sleeping bag, comprising

a hood back part having a pair of enclosed arm and hand portions extending from opposite sides thereof;

a lower back part affixed to and extending from the hood back part;

a hood front part having a face opening therein and a pair of enclosed arm and hand portions extending from opposite sides thereof and corresponding to the arm and hand portions of the hood back part and affixed to the hood back part to accommodate the head, upper chest area and arms of a user of the bag;

a lower front part affixed to and extending from the hood front part and affixed to the lower back part to accommodate the remaining torso of a user of the bag; and

a zipper extending down the center of the hood front part from the face opening thereof and down the center of the lower front part to the bottom edge thereof.

4,033,002

LIFE SAVING EQUIPMENT FOR VESSELS

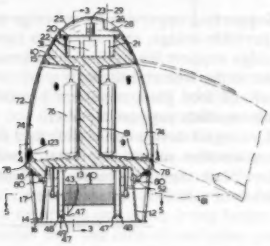
William York Higgs, Gibsons, Canada, assignor to Intercontinental Marine Limited, Vancouver, Canada

Continuation-in-part of Ser. No. 471,964, May 21, 1974, abandoned. This application Jan. 16, 1976, Ser. No. 649,788

Claims priority, application United Kingdom, May 21, 1973, 24113/73

Int. Cl.² B63C *9/22*

U.S. Cl. 9—14 **29 Claims**



1. Life saving apparatus for vessels comprising a buoy suitable for being carried by a vessel in a manner providing automatic release and flotation of the buoy should the vessel sink, said buoy including a body having sufficient buoyancy to cause the buoy and parts carried thereby to float free from the sinking vessel, a cable of adequate strength to act as an anchor cable connected with the buoy and for connection with the vessel so as to maintain connection between the floating buoy and the vessel after the vessel has sunk, wherein the buoy includes a casing filled with rigid buoyant material imparting strength to the body of the buoy, said anchor cable being connected to a lower part of the buoy so that when the buoy is floating the weight of the cable and relative weights of the remaining parts of the buoy hold the buoy upright with the anchor cable extending from its lower end, said body having at least one recess therein opening into that surface of the body which is at the side when the buoy is floating upright, said recess having outwardly sloping side surfaces and being surrounded by said rigid buoyant material which forms a solid structure connecting the upper and lower parts of the buoy above and below said recess, said recess being normally closed by a cover which forms an enclosure with said recess, an inflatable life raft normally stowed in deflated condition in said enclosure together with a source of pressurized gas for inflating said life raft, said source of pressurized gas communicating with valve means controlling flow of gas into the life raft for its inflation, said valve means being operable by release means extending out of said enclosure, said cover of the recess being joined to the buoy body by holding means which holding means are so arranged as to permit the life raft to dislodge said cover and to expel itself from said enclosure during its inflation, whereby said valve means are operable from outside the enclosure to cause the life raft to inflate and expel itself from the buoy.

4,033,003

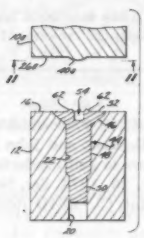
HEAD FORMING METHOD

Emilio R. Marroquin, Lawndale, Calif., assignor to Briles Manufacturing, El Segundo, Calif.

Filed Nov. 7, 1975, Ser. No. 629,856

Int. Cl.² B23G *9/00*; B21K *1/46*

U.S. Cl. 10—10 R **12 Claims**



1. A method of forming an undercut slot of "bowtie" configuration in the head of a fastener which comprises the steps of:

applying a first header punch member to said head to form a primary head surface with a "bowtie"-shaped slot recessed below said surface and a single bulge of material projecting upwardly from said surface adjacent to each side of said slot, each of said bulges of material being elongated in the longitudinal direction of the slot and continuously convexly curving from a greatest height above said primary surface proximate the slot down to an intersection with said primary surface spaced from said slot, and

applying a second header punch member to said head to compress said bulges of material down into the head below the level of said surface laterally displacing and forming material of the head into a single, elongated lateral bulge in each side of the slot to produce an undercut slot configuration between said lateral bulges, said curvature of each of said upwardly projecting bulges causing each of said lateral bulges to convexly curve in the direction from the bottom to the top of the slot.

4,033,004

BOOKBINDING MACHINE

Yasuji Sugioka, Kyoto, Japan, assignor to Taiyo Seiki Co., Ltd., Kyoto, Japan

Filed Mar. 29, 1976, Ser. No. 671,262

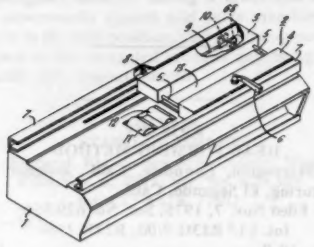
Claims priority, application Japan, Apr. 7, 1975, 50-47219[U]

Int. Cl.² B32B *1/04*

U.S. Cl. 11—1 AD **9 Claims**

1. A bookbinding machine comprising: a clamp carriage including means for clamping a book comprising a plurality of piled sheets of paper or the like to be bound; means for reciprocating said clamp carriage along a predetermined path; adhesive applicator means disposed in said path for applying

adhesive to the back of said book as it is moved along said path; and cover sheet supporting means for adhering a cover sheet onto said back when said book has returned to its original position after reciprocal movement along said path.



4,033,005

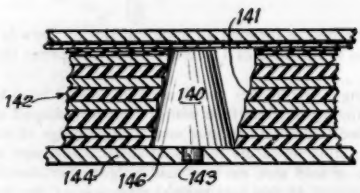
BEARING PAD ASSEMBLY

Daniel E. Czernik, Hinsdale, and John F. Brady, Wood Dale, both of Ill., assignors to Felt Products Mfg. Co., Skokie, Ill.

Filed Dec. 20, 1974, Ser. No. 534,708

Int. Cl.² E01D *19/06*

U.S. Cl. 14—16.1 **9 Claims**



7. A bearing assembly ready for installation in a bridge construction, wherein said bridge construction includes a load carrying member and a bridge support, comprising a mounting plate for mounting upon said support, an elastomeric bearing pad having side edges and end edges and being mounted on said mounting plate and defining contactor surfaces extending upwardly from said mounting plate and having a generally flat expansive upper surface and embedding shim means spaced above said mounting plate and lying generally parallel to said upper surface, high strength metallic shear controlling means fixed to and extending upwardly from said mounting plate at least to the elevation of said shim means and positioned adjacent said contactor surfaces but having surface portions spaced from and proportioned relative to said contactor surfaces so that when said bearing pad is strained in shear beyond a predetermined amount in the direction of said end edges and is deformed toward said shear controlling means, said shear controlling means will bear against said bearing pad at the elevation of said shim means, an upper layer of polytetrafluoroethylene intimately contacting and secured to said upper surface so as to overlie said upper surface and provide an upper slide surface for said bearing pad, and a slide plate assembly for mounting to said load carrying member and having a generally flat slide surface intimately contacting and of greater expanse than said upper slide surface of said elastomeric bearing pad for accommodating sliding movement of said slide plate relative to said elastomeric bearing pad, and in which there are connector means provided at the side edges of said bearing pad, said connector means securing said slide plate assembly in overlying relation to said bearing pad to resist movement of said slide plate in the direction of the side edges of said bearing pad and to help prevent the separation of the contacting slide surfaces of said slide plate assembly and said bearing pad.

4,033,006

SWINGABLE SUPPORT LEG FOR A BRIDGE

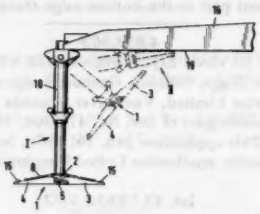
Friedhelm Soffge, Kornwestheim; Ortwin Piper, Schwieberdingen, and Gerhard Albrecht, Illingen, all of Germany, assignors to Dr. -Ing. H.c.F. Porsch Aktiengesellschaft, Germany

Filed May 12, 1975, Ser. No. 576,444

Claims priority, application Germany, May 11, 1974, 2422932

Int. Cl.² E01D *19/02*

U.S. Cl. 14—75 **22 Claims**



1. Supporting apparatus for a bridge or the like, especially for a portable bridge, said apparatus comprising:

a bridge support leg having an intermediate support member at the free end thereof,

a pair of foot plate members pivotally supported at the intermediate support member,

and a control device connecting said foot plate members to one another such that pivotal movement of one of said foot plate members results in pivotal movement of the other of said foot plate members.

4,033,007

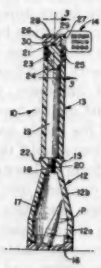
TOOTHBRUSH

Joseph Hadary, 5405 Linden Court, Bethesda, Md. 20014

Continuation-in-part of Ser. No. 564,074, April 1, 1975. This application Apr. 7, 1976, Ser. No. 674,438

Int. Cl.² A46B *9/10*

U.S. Cl. 15—172 **6 Claims**



1. A toothbrush, comprising: an elongate handle means having opposite end portions, one of said end portions comprising a hollow, diametrically enlarged base capable of supporting the toothbrush in an upright position and of a size to receive and store a bristle head therein, said base extending over approximately one-third the length of the handle means; the other end of the handle means including en elongate shaft fixed at one end thereof to one end of the base and extending axially therefrom; a sleeve telescopically received over the shaft and axially slidable relative thereto, said sleeve and shaft

being approximately the same length and extending over approximately the other two-thirds of the length of the handle means; a bristle head adjustably carried by the handle means at said other end thereof and including a bristle head shaft projecting therefrom, said bristle head shaft extending at approximately a right angle to the axis of the handle means and releasably adjustably engaged with the handle means to support the bristle head in adjusted positions on the handle means; and bristles on the bristle head extending in a direction mutually perpendicular to the axis of the handle means and the axis of the bristle head shaft.

4,033,008

TOOTHBRUSH

William C. Warren, North Brunswick; Anthony R. Volpe, Somerset, and Kedar N. Rustogi, Kendall Park, all of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 5, 1976, Ser. No. 673,769

Int. Cl.² A46B 9/04

U.S. Cl. 15—167 R **9 Claims**

1. A toothbrush comprising a handle terminating at one end in a head and at least two distinct groups of bristle tufts projecting from the head, one of said groups comprising a plurality of rows of relatively soft bristle tufts extending longitudinally of the head and the other of said groups comprising rows of relatively hard bristle tufts extending longitudinally of the head alongside and laterally outwardly and on opposite sides of said one group, the tufts of said one group being longer and of smaller diameter bristles than the tufts of said other group, and a transverse row of bristle tufts on the end of the head remote from the handle and comprising bristle tufts that are longer than any of the other bristle tufts on the head the bristle tufts of said end row being harder and of larger diameter than the bristle tufts of said one group.

4,033,009

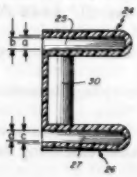
HANDLES FOR SUPPORTING A DISH OR THE LIKE IN A MICROWAVE OVEN

Lynne E. Hoinash, Brighton, Mass., assignor to Sage Laboratories, Inc., Natick, Mass.

Continuation of Ser. No. 544,295, Jan. 27, 1975, abandoned. This application Apr. 9, 1976, Ser. No. 675,512

Int. Cl.² A47J 45/07

U.S. Cl. 16—114 R **8 Claims**



1. A handle for a dish or the like food container for supporting the dish in a microwave oven, said handle comprising opposite end sections and an interconnecting section, each end section having means defining a slot for receiving an edge of the dish, wherein the slots of the opposite end sections are close to but of a different width to permit selective fitting of the handle to the dish, said opposite end sections each including a bowed wall defining said slot so that said slot has a maximum and minimum width.

4,033,010

HANDLES

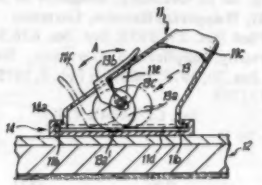
Charles McCalla, Disley, England, assignor to Flock Development and Research Company Limited, England

Filed Dec. 10, 1975, Ser. No. 639,297

Claims priority, application United Kingdom, Apr. 17, 1975, 15784/75

Int. Cl.² A46B 5/02

U.S. Cl. 16—114 R **9 Claims**



2. A handle arrangement in combination with a lipped channel comprising a base plate having spaced opposed lateral edges for engagement with respective opposite longitudinal sides of the channel, a handle member extending from said edges and outwardly of the plane defined thereby and a locking means arranged in association with the handle member and selectively adjustable about a pivot axis parallel to the said opposed lateral edges between a first, or datum, position wherein a part thereof is relatively retracted in relation to the general plane of the edges and a second position wherein said part is displaced outwardly from such plane, the said locking means comprising an edge cam having a periphery for engagement with the lipped channel intermediate the lateral limits thereof when the locking means is in the said second position, which second position represents an over-center position of the cam.

4,033,011

VEHICLE FLOOR TRIMMING FASTENING ARRANGEMENT

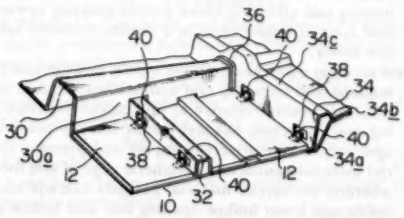
Toshiaki Endo, Fujisawa, and Toshiro Hatta, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 26, 1975, Ser. No. 635,555

Claims priority, application Japan, Dec. 24, 1974, 49-501800

Int. Cl.² A44B 21/00

U.S. Cl. 24—73 FT **5 Claims**



1. An arrangement for fastening a floor trimming to a vehicle floor panel comprising:

an elongated rigid member formed into a channel member with a pair of said walls and a head wall, said side walls being foot portions generally opposite to said head wall,

said elongated rigid member being firmly connected at said foot portions to said vehicle floor panel, one of said side walls being formed with an inverted U-shaped opening, said one side wall having a lug portion which is surrounded by said inverted U-shaped opening; and

a hook member fastened to an edge portion of said floor trimming and hookable on said lug portion.

4,033,012

BUTTON, PARTICULARLY FOR CLOTHING PIECES

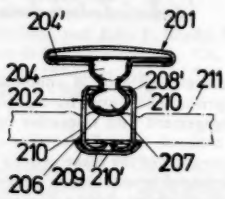
Friedhelm Kramer, Ennepetal-Milspe; Günter Wolfertz, Wuppertal-Barmen; Harald Klaus, Wuppertal-Elberfeld; Raimund Stanik, Wuppertal-Beyenburg; Horst Gustav Appelt, Wuppertal-Barmen, and Walter Ramspott, Wuppertal-Cronenberg, all of Germany, assignors to Schaeffer-Homberg GmbH, Wuppertal-Barmen, Germany

Filed Oct. 29, 1975, Ser. No. 626,987

Claims priority, application Germany, Nov. 14, 1974, 7438001[U]; Jan. 30, 1975, 2503798; Feb. 7, 1975, 2505139; July 16, 1975, 2531728

Int. Cl.² A44B *1/42*

U.S. Cl. 24—90 D **8 Claims**



1. A button, particularly for clothing pieces including a carrier material in fastened condition, comprising

a foot part having a wall formed in the shape of a vertically oriented open ended hollow member defining a hollow cavity therein, said foot part having a lower peripheral edge defining a lower opening communicating with said cavity and abutting an upper side of the carrier material and clamping claws integrally extending substantially flush from said wall and said lower peripheral edge and non-rotatably clamping said peripheral edge and the carrier material and piercing through the latter,

a button plate operatively freely selectively tiltably seated on said foot part,

a tilting pin secured to said button plate, said tilting pin having a bulge-shaped lower end,

said foot part having an upper head end, the latter being formed with an insert opening communicating with said hollow cavity and freely tiltably mountably receiving said bulge-shaped lower end of said tilting pin therein,

a counter holder plate abutting an underside of the carrier material, and having curved deflection channel means for turning said clamping claws around pointing upwardly in said counter holder plate in a direction toward said hollow cavity,

said securing claws passing downwardly through said carrier material and engaging said counter holder plate in non-rotatable position relative to said carrier material, entering said deflection channel means thereby being turned upwardly, cooperatively clamping and pressing the carrier material against said peripheral edge of said foot part, whereby the carrier material partially extends archingly inside said lower hollow opening into said hollow cavity, and

said bulge-shaped lower end of said tilting pin having a vertical length substantially equal to the height of said foot part from said upper head end to said lower peripheral edge and having a curved lower end surface aligned adjacent the level of said peripheral edge of said foot part and pivotal relative to said foot part, said lower end surface abutting the carrier material, thereby dampening noise and providing a friction brake action effect for said tilting pin.

4,033,013

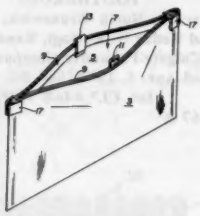
FLEXIBLE MAGNETIC PLASTIC STRIP CLOSURE

John Elwood Peterson, 90 Kent Court, Apt. 19, Daly City, Calif. 94015

Filed Nov. 18, 1975, Ser. No. 633,028

Int. Cl.² E05C *19/16*; A44B *17/00*

U.S. Cl. 24—201 B **4 Claims**



1. A closure for a flexible case or the like having flexible side walls forming a mouth opening, a first strip of flexible magnetic tape, means securing said first strip of flexible magnetic tape to one of said flexible side walls, a second strip of similar length of such tape, means securing said second strip to said other side wall in position to be engaged by said first strip, said strips having opposite exposed polarities to effect a normal attraction of one for the other when in proximity to each other, and at least one opening tab extending at one end at least partially across the inner or exposable surface of one of said strips of flexible magnetic tape and, at its other end, extending beyond the proximate edge of said side walls, whereby application of finger pressure thereto to separate said strips and open said flexible case, will not strain said securing means. wherein, said closure is characterized by a pair of opening tabs, each of said tabs being affixed at one end to the inner or exposable surface of a different one said strips and extending upwaredly to a point above the proximate edges of said side walls, with both said openings tabs being located within a central region of the associated side walls

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4,033,014

CONTINUOUS MOLDED SLIDE FASTENER STRINGER AND METHOD AND APPARATUS FOR MANUFACTURE

Harry F. Manning, Meadville, Pa., assignor to Textron, Inc., Providence, R.I.

Filed May 17, 1976, Ser. No. 687,075

Int. Cl.² A44B *19/34*

U.S. Cl. 24—205.16 R **17 Claims**

1. A stringer for a slide fastener comprising

a carrier tape,

a train of spaced coupling elements disposed along one edge of the tape,

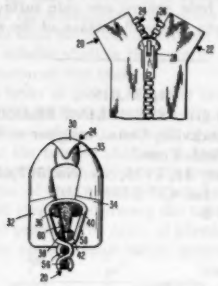
each of said coupling elements having a head portion and a pair of leg portions extending from opposite sides of the head portion,

each pair of said pairs of leg portions extending in substantially the same direction from the respective head portion,

at least four spaced connecting threads,

pairs of said connecting threads having respective spaced segments embedded in spaced relationship in respective leg portions of the pairs of leg portions to interconnect the coupling elements, and

thread means encircling the connecting threads between the



coupling elements and securing the connecting threads to the one edge of the tape.

4,033,015

LOCK FOR A SAFETY BELT

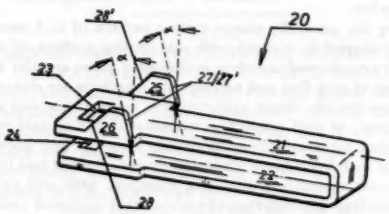
Peters Uwe, Hamburg, and Horst Minolla, Heidestieg, both of Germany, assignors to Klippan GmbH Hamburg, Hamburg, Germany

Filed Sept. 3, 1974, Ser. No. 503,009

Claims priority, application Germany, Nov. 15, 1973, 2356090

Int. Cl.² A44B *19/00*

U.S. Cl. 24—230 AL **5 Claims**



1. A belt lock for a safety belt, especially a vehicle safety belt, having a housing in which is provided a push-button for actuating a spring-biased bolt, there being provided in the housing at least one lock plate having a guide channel, the longitudinal axis of which extends transversely to the direction in which a plate-like slide-in tongue with lateral locking notches slides, the bolt being movable in the guide channel and being directly connected to a guide part, which has two limbs which are disposed on the outer faces of the lock plate and are firmly connected to the bolt, and the faces of, on the one hand, the locking notches on the slide-in tongue and of, on the other hand, the bolt, which bear against each other in the locking position, being disposed obliquely in relation to the longitudinal central axis of the slide-in tongue, characterized in that the push-button and the guide part are formed as two separate elements which are each provided with an inclined face which slopes towards the longitudinal axis of the guide channel, the inclined face on one of the elements being presented to the inclined face on the other.

4,033,016

CRANKSHAFT WELDED TOGETHER FROM INDIVIDUAL ELEMENTS, AND METHOD OF MAKING SAME

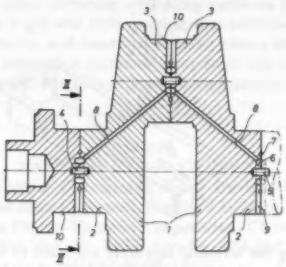
Karl Mayer, Nuremberg, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg AG, Nuremberg, Germany

Division of Ser. No. 585,301, June 9, 1975. This application May 5, 1976, Ser. No. 683,333

Claims priority, application Germany, June 8, 1974, 2427801

Int. Cl.² B21K *1/08*

U.S. Cl. 29—6 **1 Claim**



1. A method of making a crankshaft from a plurality of individual elements each comprising a crank pin section with an end face and bearing surface means, and also comprising a main shaft journal section with an end face and with bearing surface means, which includes in combination the sequential steps of: first forging the individual elements in a die as symmetrically embodied elements, then finish machining all crank pin half sections including their end faces, thereafter premachining all main shaft journal sections, subsequently drilling all lubricating oil grooves and conduit means communicating therewith, engaging with each other the crank pin end faced to be welded together and offsetting the same in the desired manner, specifically electron beam welding together the crank pin sections to be connected to each other while starting the electron beam on radially extending lubricating conduits and ending the same after only one revolution while setting the electron beam to a desired depth, finish machining the main shaft journal sections, placing together each two main shaft sections to be welded together and offsetting the same to the desired extent, thereafter specifically electron beam welding the main shaft journal sections together and honing the crank pin sections and main shaft journal sections, and finally machine-rounding the ends of the radial lubricating conduits in one working step.

4,033,017

MANUFACTURING METHOD OF A HERMETICALLY SEALED TERMINAL

Akira Watanabe, Funabashi, and Saburo Harada, Tokyo, both of Japan, assignors to Kabushiki Kaisha Seikosha and Koto Denki Kabushiki Kaisha, both of, Japan

Filed Jan. 28, 1976, Ser. No. 653,003

Claims priority, application Japan, Jan. 28, 1975, 50-11660; Jan. 28, 1975, 50-11661

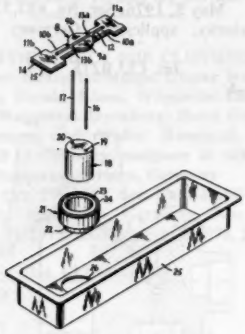
Int. Cl.² B01J *17/00*

U.S. Cl. 29—25.35 **1 Claim**

1. A method of manufacturing a hermetically sealed terminal assembly comprising,

a. providing a terminal assembly comprised of a terminal plate element composed of conductive material having predetermined weakened sections and having a brazing compound on at least a part thereof, a plurality of lead wires, a glass material having through holes through which said lead wires extend, a metallic outer frame having said glass material inserted therein and having a

brazing compound on a part thereof, and a metallic casing having said outer frame disposed thereon with the brazing compound in contact therewith and which encloses a quartz crystal resonator or the like, said terminal plate element being disposed on said glass material such that the brazing compound contacts said lead wires,



b. heating the terminal assembly one time to a temperature at which said glass material softens and said brazing compounds on said terminal plate element and said outer frame become fused to thereby integrally connect the component parts of the terminal assembly, and

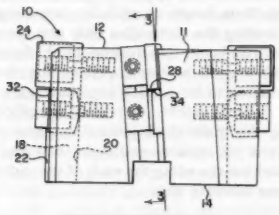
c. breaking off end portions of said terminal plate element at said weakened sections to thereby provide a hermetically sealed terminal assembly.

4,033,018

INDEXABLE MILLING CUTTER

Harry William Bloink, Redford, Mich., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed July 16, 1976, Ser. No. 705,975
Int. Cl.² B26D *1/12*
U.S. Cl. 29—105 A **5 Claims**



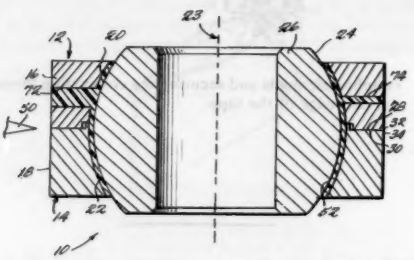
1. A cutting tool comprising an annular body with a central axis, a pair of end faces and an outer peripheral surface, a plurality of slots formed in the outer peripheral surface intersecting at least one end face of the body, each slot defining a generally longitudinally extending bottom wall surface and a pair of generally opposing side wall surfaces, an indexable cutting insert positioned in each slot and configured to define side surface faces, leading, trailing and bottom edges with the leading edge adjacent said at least one end face of the body, a wedge member positioned in the slot so as to bear against one side surface face of the cutting insert and one side wall surface of the slot securing the cutting insert therein, a backer plate positioned in the slots longitudinally behind each cutting insert, the backer plate also defining side surface faces, leading, trailing and bottom edges, the bottom edge of the backer plate being a narrow, non-linear surface extending from the leading edge to the trailing edge thereof, said non-linear surface including a point intermediate said leading and trailing edges which is lower than any other point on said bottom edge surface thereby permitting the backer plate to rock against the bottom wall into a position which provides accurate line contact between the leading edge of the backer plate and the trailing edge of the cutting insert, a wedge member positioned in the slot so as to bear against one side surface face of the cutting insert and one side wall surface of the slot.

4,033,019

METHOD OF ASSEMBLING BEARINGS

Stanley S. Orkin, Rockville, Conn., assignor to Kamatics Corporation, Bloomfield, Conn.

Filed July 21, 1975, Ser. No. 597,632
Int. Cl.² B21D *53/10*
U.S. Cl. 29—149.5 B **4 Claims**



1. A method of assembling a self-aligning bearing comprising a truncated ball member, a first ring-shaped member having a generally planar mating surface and a second ring-shaped member having a generally planar mating surface, said ring-shaped members having inner annular surfaces, said mating surfaces of said first and second ring members each having a shallow circumferential recess formed therein adjacent said respective inner annular surfaces, and said inner annular surfaces of said first and second ring members being symmetrical about a common central axis, the method comprising the steps of:

disposing said truncated ball member in an opening defined by said inner annular surface of said first ring-shaped member,

placing the generally planar mating surface of said second ring-shaped in contact with said mating surface of said first ring-shaped member so that said inner annular surfaces of said first and second ring members are disposed symmetrically about said common central axis and said recesses in said respective mating surfaces of said ring-shaped members are immediately adjacent one another so as to define a circumferential cavity adjacent said inner annular surfaces of said ring members with said cavity extending circumferentially about said common central axis,

directing an energized beam at said mating surfaces substantially perpendicular to said common central axis and in the plane defined by said mating surfaces to fusion bond said mating surfaces of said first and second members beginning at the outer peripheral surface to a point closely adjacent to said cavity defined by said mating recesses.

4,033,020

METHOD OF MAKING A SLIP JOINT

Bernard C. Hudgens, West Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio

Filed Aug. 4, 1975, Ser. No. 601,481
Int. Cl.² B21D *53/10*
U.S. Cl. 29—149.5 NM **10 Claims**

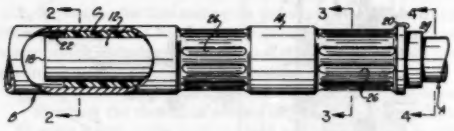
1. A method of providing a slip joint between a pair of shafts, said method comprising providing a londitudinally extending tubular shaft,

providing a second longitudinally extending shaft,

positioning end portions of the shaft in a telescopic relationship with the shafts extending in opposite directions from the area of the telescopic relationship between the shafts, the second shaft being circumscribed by and spaced apart from the tubular shaft in the area of the telescopic relationship between the shafts,

providing a layer of plastic material between the shafts in the area of the telescopic relationship between the shafts,

locking the layer of plastic material against axial movement relative to the tubular shaft by deforming at least a portion of the tubular shaft inwardly toward the second shaft in the area of the telescopic relationship between the shafts, said step of deforming the tubular shaft including the step of pressing the layer of plastic material inwardly against the second shaft while maintaining the tubular



shaft spaced from the second shaft to grip the second shaft with the layer of plastic material, and

enabling the shafts to be freely moved axially relative to each other to vary the extent of the telescopic relationship between the shafts by heating to expand the layer of plastic material and then cooling to contract the layer of plastic material to provide clearance between the second shaft and the layer of plastic material due to the difference in coefficient of expansion of the second shaft and the layer of plastic material, said step of heating to expand the layer of plastic material including the step of expanding the layer of plastic material in an axial direction relative to the shaft to stress relieve said plastic layer and said step of cooling to contract the layer of plastic material including the step of contracting the layer of plastic material in a direction extending transversely to the longitudinal axes of the shafts.

4,033,021

GAS SEPARATION NOZZLES AND METHOD AND APPARATUS FOR PRODUCING SUCH NOZZLES

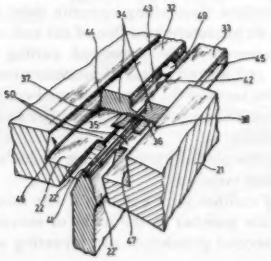
Gerd Tybus, Poing; Ludwig Ebner, Poering; Rudolf Waldhöer, Feldkirchen; Peter Bichler, Schondorf; Wilhelm Bier, Leopoldshafen; Peter Happe, Eggenstein, and Frowald Weis, Karlsruhe, all of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Munich and Gesellschaft fur Kernforschung m.b.H., Karlsruhe, both of, Germany

Filed Apr. 15, 1975, Ser. No. 568,301

Claims priority, application Germany, Apr. 20, 1974, 2419192

Int. Cl.² B23P *15/00, 13/00*

U.S. Cl. 29—157 C **11 Claims**



1. A method of producing gas separation nozzles for separating gases or vapors having different molecular weights from each other, comprising the steps of shaping a pair of sectional rods by pulling said rods along a high precision sliding track while pressing the rods against the track, and while removing material from the rods to form a pair of rod shaped separation elements having a projecting lip extending therealong, nozzle edges along said lip and vertically extending surfaces substantially opposite said lip, machining a holding body to form a dovetail groove therein and a deflection groove extending from the bottom of the dovetail groove, providing gas flow passages through said holding body to said deflection groove, assembling said pair of separation elements in said dovetail groove with their vertically extending surfaces facing each other to form a gap and their nozzle edges extending into said deflection groove, and inserting wedging pieces into said gap to press said separation elements away from one another and against the respective side of said dovetail groove.

4,033,022

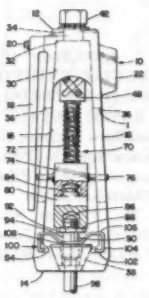
HAND OPERATED SWAGER

William E. Currie, Cleveland Heights; David W. Gunning, Novelty, and John G. Russell, Highland Heights, all of Ohio, assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Nov. 24, 1975, Ser. No. 634,865

Int. Cl.² B23P *19/02*

U.S. Cl. 29—237 **8 Claims**



1. Apparatus for swaging a fitting onto a hose comprising;

a housing,

turning means rotatably mounted at one end of the housing and fixed against axial movement relative to the housing,

means on the other end of the housing for receiving a swaging die,

pusher means threadably engaged with said turning means, and

means interlocking said pusher means with said housing for preventing rotation of the pusher means relative to the housing whereby rotation of the turning means imparts axial motion to the pusher means without imparting rotation thereto,

said turning means comprising a bolt extending through an opening near the one end of the housing, and a ball nut assembly connected to the bolt and threadably engaging the pusher means whereby rotation of the bolt rotates the ball nut assembly to impart axial movement to the pusher means.

4,033,023

PROCESS FOR REFURBISHING METAL BUOYS

Albert E. Slaughter, and Nan Burke Slaughter, both of P.O. Box 855, Guayama, P.R. 00654

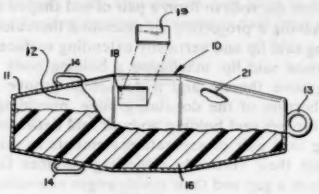
Filed Oct. 8, 1975, Ser. No. 620,824

Int. Cl.² B23P *7/00;* **B63B** *21/52, 51/02*

U.S. Cl. 29—401 B **3 Claims**

1. A method for repairing corroded metal buoys which comprises removing a metal section to form an aperture in

said buoy, filling the interior of the buoy through said aperture with polyurethane foam which is foamed in place from a foam precursor-catalyst mixture, replacing and rewelding said metal



section, scraping marine growth and scale from said buoy exterior, and coating the exterior of said buoy with multiple plies of fiber glass-resin laminate.

4,033,024

METHOD FOR PRODUCING EXTRUDED STRUCTURAL PROFILES FROM SCRAP MATERIALS OF ALUMINUM BASED METAL

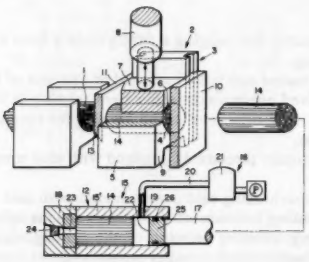
Toshiro Takahashi; Toshihiro Nagano; Katsuhiko Nakamura, all of Shizuoka; Masaru Kikuchi, Fuji, and Kazuo Suzuki, Shizuoka, all of Japan, assignors to Riken Keikinzoku Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed June 25, 1975, Ser. No. 590,289

Claims priority, application Japan, June 14, 1975, 50-72156

Int. Cl.² B21C *23/04*; B23P *7/00*

U.S. Cl. 29—403 **11 Claims**



1. A method for producing extruded structural profiles from elongated lengths of scrap materials of aluminum base metal which comprises the steps of mechanically compressing the lengths of scrap materials under pressure applied in a direction transverse to their length to form a self-sustaining, compacted and coherent substantially cylindrical body of scrap materials capable of being inserted into an extruder housing, said body having air passages extending in a longitudinal direction along its length between the lengths of material and opening to the exterior of said body, heating the body to a hot extrusion temperature, inserting the heated body into the extruder housing, applying suction to the interior of the extruder housing when in a closed condition to evacuate air from said air passages, and extruding the body from said housing through a die opening into a structural profile of the desired cross-section.

4,033,025

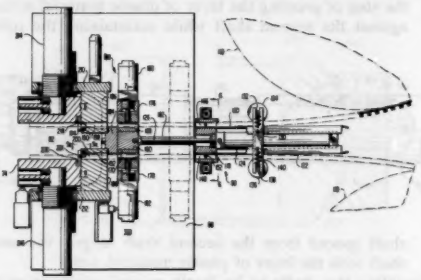
METHODS FOR FABRICATING WOODEN FRAMES AND THE LIKE

John Calvin Jureit, Coral Gables; Roy Leutwyler, Miami; Larry Brodsky, Miami; Benjamin Kushner, Miami, and Adolfo Castillo, Miami, all of Fla., assignors to Automated Building Componen*s, Inc., Miami, Fla.

Division of Ser. No. 462,443, April 19, 1974, Pat. No. 3,939,548, which is a division of Ser. No. 317,095, Dec. 20, 1972, abandoned. This application July 30, 1975, Ser. No. 600,506

Int. Cl.² B23P *17/02*

U.S. Cl. 29—417 **9 Claims**



1. A method for joining transversely spaced generally parallel elongated wooden side members and elongated longitudinally spaced intermediate wooden members disposed between said side members to form a frame thereof by applying a sheet metal connector plate, of the type having integrally struck teeth projecting from one side thereof, to joints formed between the side and intermediate wooden members comprising the steps of:

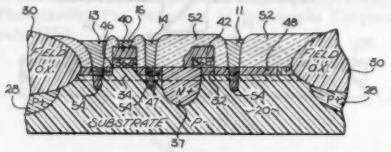
1. providing first and second coils of connector stock of the type having integrally stuck teeth projecting from one side thereof,
2. feeding the connector stock from the coils to respective first and second pressheads, each presshead being movable along a predetermined path from a retracted to an extended position and each presshead carrying a cutting edge thereby defining relative to the cutting edge a predetermined line of cut along the connector stock,
3. providing a reaction surface cooperable with each cutting edge and comprised of a plurality of tines defining a plurality of laterally spaced recesses;
4. moving each presshead and locating each presshead adjacent a joint between a side member and an intermediate member;
5. guiding the stock from the coils to the presshead so that the teeth move along the recesses as the stock is fed into the path of movement of the pressheads;
6. displacing each presshead to engage the cutting edge and reaction surface tines along opposite sides of the stock and along its predetermined line of cut and, upon continued displacement of the presshead, cutting the stock to form first and second plates of predetermined length,
7. pressing the teeth of the first and second connector plates thus formed into a joint of a side member and an intermediate member,
8. advancing the partially joined frame of side members and intermediate members,

and locating another joint between a side member and an intermediate member in the paths of movement of said first and second pressheads and repeating steps (6) and (7).

4,033,026
HIGH DENSITY/HIGH SPEED MOS PROCESS AND DEVICE

Richard D. Pashley, Mountain View, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Dec. 16, 1975, Ser. No. 641,259
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **9 Claims**



1. A process for fabricating an enhancement mode transistor and a depletion mode transistor on a p-type silicon substrate which includes the fabrication of a buried contact comprising the steps of:

doping a first region of said substrate with an n-type dopant to adjust the threshold of said depletion mode transistor;

forming a gate oxide layer on said substrate, said gate oxide layer covering at least a portion of said first region;

doping the upper surface of said substrate with a p-type threshold adjusting dopant to adjust the threshold of said enhancement mode transistor;

defining a window through said gate oxide layer to expose a portion of said substrate adjacent to said first region;

forming a first and second polycrystalline silicon gate on said gate oxide layer, said first gate spaced apart from said first region, said second gate formed on said oxide layer such that at least a portion of said first region is disposed beneath said second gate with said second gate extending into said window and contacting said substrate, including the doping of said gates with an n-type dopant and the formation of an n-type second region at said window, said second region contacting said first region;

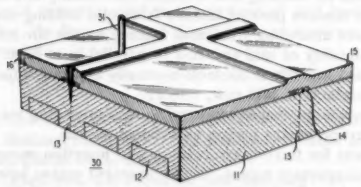
forming a first source region and a first drain region in alignment with said first gate, said first source region contacting said second region, and forming at least a second drain region in alignment with said second gate spaced apart from said second region;

whereby an enhancement mode and a depletion mode transistor are fabricated with a buried contact which couples said gate and source region of said depletion mode transistor with said drain region of said enhancement mode transistor.

4,033,027
DIVIDING METAL PLATED SEMICONDUCTOR WAFERS

Richard Barton Fair, Sinking Spring; John Saylor Hayes, Fleetwood, and William Morgan Rosser, Sweet Valley, all of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 26, 1975, Ser. No. 617,036
Int. Cl.² B01J *17/00*
U.S. Cl. 29—583 **5 Claims**

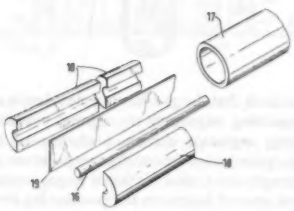


1. A process for fabricating semiconductor devices from a semiconductor wafer having a pair of opposed major surfaces comprising, (1) first forming a plurality of devices in a portion of the wafer adjacent one surface thereof, (2) next forming on the opposite surface of said wafer a photoresist pattern conforming to the separation lines between said devices, (3) next applying a layer of metal including at least one selected from the group comprising gold or an alloy of gold on said opposite surface and overlying said photoresist pattern, (4) applying mechanical cutting means to penetrate said metal layer, said photoresist pattern and at least a portion of said semiconductor body in accordance with said photoresist pattern, and (5) dividing said semiconductor wafer into a plurality of semiconductor devices in accordance with said pattern.

4,033,028
METHOD OF MAKING HEATING CABLES

David Malcolm Howie, Carrying Place; Roy Victor W. McKenzie, Belleville, and James Ronald Snape, Brighton, all of Canada, assignors to Pyrotenax of Canada Limited, Trenton, Canada

Division of Ser. No. 587,161, June 16, 1975, Pat. No. 4,001,760. This application Apr. 22, 1976, Ser. No. 679,325
Claims priority, application United Kingdom, June 21, 1974, 27623/74
Int. Cl.² H05B *3/18*
U.S. Cl. 29—611 **10 Claims**



1. A method of making a mineral insulated electric heating cable, having the characteristic that for a given supply voltage the heat generated per unit length of the cable is substantially unaffected by the total length of the cable, comprising: forming an assembly comprising two or more ductile metallic conductors, namely a surrounding sheath and at least one other conductor within and spaced from it, at least one thin layer consisting of predominantly resistive material, which does not include an admixture of any significant amount of insulating material, supported by a carrier and individually or collectively contacting at least two of the conductors throughout the length thereof, and mineral insulating material substantially filling the remaining space within the sheath; and reducing the cross-section of the assembly to form the mineral insulating material into a homogeneous body of compacted insulating powder completely filling the remaining space whilst maintaining at least one layer of resistive material individually or collectively contacting at least two of the conductors throughout the length thereof.

4,033,029
METHOD OF ASSEMBLING CALIBRATED SWITCH

Denis G. Wolfe, Santa Ana, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Aug. 27, 1976, Ser. No. 718,288
Int. Cl.² H01H *11/00*
U.S. Cl. 29—622 **8 Claims**

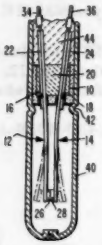
1. A method of assembling a thermally calibrated switch comprising the steps of

supporting a container in an upright position, said container having a pair of element receiving passages in the bottom thereof;

inserting a pair of elongated contact elements through the respective passages with supporting segments of the contact elements extending above the bottom of the container and with contact ends of the elements extending downward from the container, said passages being of sufficient size to allow pivotal movement of the contact ends of the elements together, said pair of contact elements having at least one temperature responsive bimetal portion, further said pair of contact elements being such that the supporting segments are inclined with respect to each other when the contact ends are engaged at a preselected operating temperature which is different from a hardening temperature for a hardenable material;

adjusting the temperature of the contact elements to the preselected operating temperature;

frictionally engaging the inclined supporting segments of the contact elements with a gravity biased positioning



member such that the positioning member is wedged with the supporting segments to oppose movement of the supporting segments during a change of temperature from the preselected operating temperature to the hardening temperature, said frictional engagement exceeding resultant upward forces on the positioning member when the temperature is changed from the preselected operating temperature to the hardening temperature;

changing the temperature of the contact elements from the preselected operating temperature to the hardening temperature after the frictionally engaging step;

placing a quantity of the hardenable material into the container around portions of the supporting segments of the contact elements; and

hardening the quantity of hardenable material at the hardening temperature to secure the contact elements in a thermally calibrated position.

4,033,030

METHOD OF MANUFACTURING KEYSWITCH ASSEMBLIES

Max S. Robinson, Richland, Wash., and Thomas J. Studebaker, Boulder, Colo., assignors to Mohawk Data Sciences Corporation, Herkimer, N.Y.

Division of Ser. No. 505,389, Sept. 12, 1974, Pat. No. 4,018,999. This application Mar. 15, 1976, S. No. 666,732

Int. Cl.² H01H 11/00

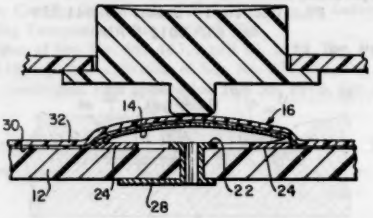
U.S. Cl. 29—622 **13 Claims**

1. A method of manufacturing a contact switch assembly for a keyboard comprising a circuit board having at least one first contact and at least one second contact provided on one side of said board, at least one electrically conductive curved resilient plate selectively electrically communicating between pairs of said first and second contacts and a retaining element comprising a film including a heat sealable thermoplastic material which maintains said resilient plates in position, comprising the steps of:

locating said electrically conductive curved resilient plates over said one side of said circuit board with at least a portion of their peripheries in electrical communication with respective ones of said second contacts;

placing said retaining element over said one side of said circuit board, said heat sealable thermoplastic material being in contact with said resilient plates and said circuit board side;

placing the assembly in a press and applying pressure to the



assembly at an elevated temperature for a predetermined time thereby bonding said heat sealable thermoplastic material to said plates and to said one circuit board side; and

removing the assembly from the press.

4,033,031

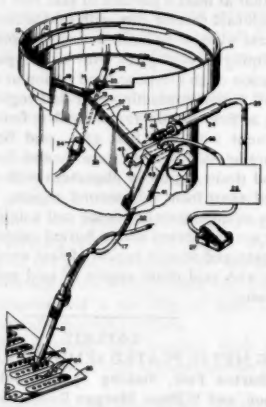
METHOD AND MACHINE FOR INSERTING ELECTRICAL CONTACTS INTO ELECTRICAL INTERCONNECTION BOARDS

George L. Ballew, North Attleboro, Mass., assignor to Augat, Inc., Attleboro, Mass.

Filed Apr. 22, 1976, Ser. No. 679,172

Int. Cl.² H05K 13/00

U.S. Cl. 29—626 **19 Claims**



1. A machine for inserting elongated electrical contacts into holes in electrical interconnection boards, said machine comprising:

means for holding a multiplicity of said contacts;

means for feeding said contacts individually and separately in tandem parallel fashion from said holding means;

means extending from said feeding means for arranging a plurality of said contacts in parallel in at least one row, said individual contacts normally abutting adjacent said contacts in said row;

escapement means mounted to said arranging means;

insertion means having an exhaust nozzle;

means for flexibly connecting said insertion means to said escapement means, said escapement means being shaped and configured to remove said contacts individually from said arranging means and feed them to said insertion means through said flexible connecting means, said escapement means having means to maintain said row of

separate contacts in said arranging means while one of said contacts is fed to said insertion means; and

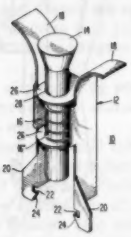
means for controlling the operation of said escapement means to eject said contacts individually from said exhaust nozzle at a predetermined rate.

4,033,032

INTEGRATED CIRCUIT PACKAGE REMOVAL TOOL

Samuel Richard Romania, and George Joseph Sprenkle, both of Phoenixville, Pa., assignors to Burroughs Corporation, Detroit, Mich.

Filed Dec. 16, 1976, Ser. No. 751,176
Int. Cl.[2] H01R *43/00*; H05K *13/04*
U.S. Cl. 29—764 **7 Claims**



1. A tool for use in removing from a connector an integrated circuit package having a metallic heat sink member extending beyond an end of said connector and including a registration aperture, said connector having a retention post for engaging said registration aperture, said tool comprising:

a body member,

said body member having a pair of spring-like parallel spaced-apart side portions, said side portions including at one extremity thereof a respective pair of thin finger-like extensions angularly disposed with respect thereto, said finger-like extension having respective cutouts for engaging the opposite edges of said integrated circuit package heat sink member, said side portions being curved respectively at the other extremity thereof,

said body member further including a central portion disposed between and connecting said side portions, said central portion comprising a pair of parallel spaced-apart sections lying in planes oriented at right angles to those of said side portions, said last mentioned sections having respective like-diameter apertures therein in substantial alignment with each other,

a plunger,

said plunger being slidably mounted within the apertures of said sections of the central portion of said body member and positioned to initially contact said connector retention post in order that a force may be applied thereto, said curved side portions of said body member permitting an opposite force to be applied via said finger-like extensions to said heat sink member,

the simultaneous application of said opposing forces resulting in the movement of said package relative to its connector, and upon the transfer of contact by said plunger from said retention post to the surface of said heat sink member, the firm grasping of said package to accomplish its removal.

4,033,033

BUS MANUFACTURING MECHANISM AND METHOD

George R. Heffner, San Diego, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

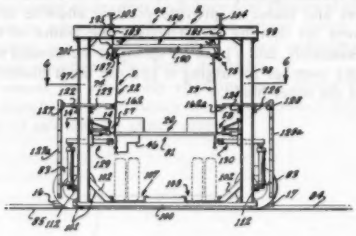
Filed Feb. 23, 1976, Ser. No. 660,554
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—824 **15 Claims**

1. Mechanism for assembling, in relative positions of final assembly, a selected plurality of sub-assemblies, each of said sub-assemblies comprising a major component of a transit vehicle and being respectively a floor assembly, a roof assembly and a left and right sidewall assembly, said mechanism comprising:

a collector in the form of a framework of a rectangular shape to receive therein the body of a transit vehicle, said framework being open on at least one end thereof to receive the various sub-assemblies of a transit vehicle to be assembled therein;

said framework having at least a plurality of transverse open frames each having upright side beams, a transverse top beam, and a transverse bottom beam;

said framework being mounted on wheels aligned transversely with respect to the open end of the collector so that the collector can travel between individual staging points where the different sub-assemblies may be loaded into the open end of the collector for assembly of a vehicle within the collector;



floor sub-assembly conveyor way means positioned within said collector framework to convey into said collector and to support therein in relative position of final assembly a floor sub-assembly, said floor sub-assembly conveyor way means being attached to the upright side beams of said transverse open frames, said sub-assembly conveyor way means being of a length approximating that of a vehicle floor assembly;

sidewall sub-assembly conveyor way means positioned within said collector framework to convey into said collector and support therein in relative position of final assembly sidewall sub-assemblies;

roof sub-assembly conveyor way means positioned within said collector framework to convey into said collector and support therein in relative position of final assembly roof sub-assemblies, and

means attaching said sidewall sub-assembly conveyor way means and said roof sub-assembly conveyor way means to said collector framework.

4,033,034

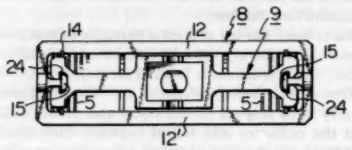
INNER BLADE MEMBER FOR ELECTRIC DRY SHAVER

Hirozo Imai, Hirakata, and Yasuo Maeda, Takarazuka, both of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed July 28, 1975, Ser. No. 599,770
Claims priority, application Japan, July 31, 1974, 49-88341
Int. Cl.[2] B26B *19/04*
U.S. Cl. 30—43.92 **5 Claims**

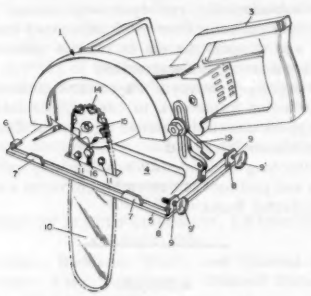
1. An electric dry shaver having a body, a thin, semi-cylindrical outer blade defining a pattern of apertures, a cooperating inner blade assembly formed of a hollow rectangular frame and a stack of semi-annular cutting elements axially spaced in the frame presenting their semi-circular edges to the outer blade, said frame being formed of synthetic plastic with the cutting elements being permanently molded in place therein, a yoke member having arms extending axially in the hollow frame and having means for captively engaging the ends of the arms to the axial ends of the frame at the respective ends of the stack of cutting elements, the engaging means including

laterally extending frictional elements which exert purely lateral force in opposed directions against the side walls of the frame free of generation of longitudinal stress in the frame, a driving means including a motor in the body, said driving means further including a reciprocated driving member coupling the motor to the central portion of the yoke member for



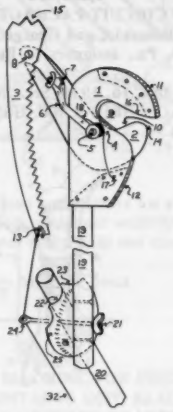
axially reciprocating the yoke member, the engaging means further including cooperating surfaces at one end of the yoke member and frame to provide positive endwise driving engagement for thereby reciprocating the frame of the inner blade assembly, and a push-up spring at the central portion of the yoke member for urging it and the inner blade assembly toward the outer blade.

4,033,035
BEAM CUTTING AND MITERING DEVICE
David G. Trimmer, 5541 Deodar, Montclair, Calif. 91763
Filed Aug. 3, 1976, Ser. No. 711,358
Int. Cl.² B27B *17/14*
U.S. Cl. 30—122 **5 Claims**



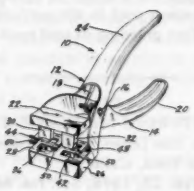
1. A cutting and mitering attachment for a portable power driven circular saw including a housing, a drive shaft wherein the saw blade has been removed therefrom and support shoe, a flat generally rectangular attachment plate, angle clip means at one end of said plate and guide flange means at the side edges thereof whereby said support shoe is flatly mounted thereon, and screw means at the other end of said plate for retaining said shoe and housing in position, a slot in said plate having a cutter bar extending therethrough so as to depend therefrom at right angles thereto, a sprocket arranged above the upper end of said cutter bar and mounted on said drive shaft, and an endless saw chain disposed on said cutter bar and extending over said sprocket so as to be driven thereby, whereby said plate may be flatly arranged on a beam and manually moved thereover so that the cutter bar and saw chain depending vertically therebelow will cut the beam as a circular saw.

4,033,036
MORRIS POLE TYPE PRUNER
Charles F. Morris, P.O. Box 223, Tenino, Wash. 98589
Filed Aug. 18, 1976, Ser. No. 715,547
Int. Cl.² B26B *13/22*
U.S. Cl. 30—144 **5 Claims**



1. A pole type pruner comprising two duplicate flat sheet metal side plates, each of an overall basic right triangle shape but with one of the two angles to its hypotenuse rounded off and the other shortened by cutting the hypotenuse to a perpendicular to the longer opposite side, each side plate having at the bottom of its top widest half a U shaped notch or cut-out extending inwards and somewhat upwards in an oblique angle to the hypotenuse to a depth of about three inches or equivalent to a little more than twice the diameter of the maximum limb size to be cut and this notch just sufficient in width to accommodate this limb size; and a short appropiate distance below the inner rounded end of this U shaped notch in each side plate is a hole thru which a pin is installed as a pivot anchor point for the cutter blade; and these side plates are in fixed position parallel to each other and spaced a distance slightly more than the cutter blade thickness, with spacers so shaped and fixed between the sides in such position as to allow free movement of the blade in a pivot swing of about 150° and said side plates fixed sidewards at their straight back edge portion against a pole section.

4,033,037
METHOD AND MEANS FOR PUNCHING SHEET MEMBERS
Jerry A. Cooley, Rte. 1, New Virginia, Iowa 50210
Filed June 26, 1975, Ser. No. 590,699
Int. Cl.² B26F *1/00*
U.S. Cl. 30—363 **6 Claims**



1. A device for punching a plurality of holes adjacent the edge of at least one sheet member, said device comprising:

a pair of elongated jaw members pivotally jointed intermediate their lengths in scissors-like fashion,

a punch adjacent one end of one of said jaw members,

an aligner on said one jaw member spaced a predetermined distance from said punch in a direction parallel to the pivotal axis of said jaw members;

said aligner and said punch each extending downwardly from said one jaw member and terminating in a lower end, said lower end of said aligner protruding downwardly a predetermined distance below said lower end of said punch.

a punch die sized to receive said punch and positioned on said other jaw member in registered alignment below said punch;

said jaw members being pivotal from an open position wherein said punch and aligner are spaced from said die to a closed position wherein said punch is matingly received within said die and said aligner is positioned beside said die

said lower end of said aligner being positioned below said lower end of said punch in both said open and said closed positions of said jaw members,

a stripper element mounted to said other jaw member including a plurality of spaced apart stripper members horizontally disposed in spaced relation above said other jaw member whereby at least one of said sheet members will fit in said space between said stripper members and said other jaw member, said stripper members being adjacent the inner and outer lateral margins of both said punch and said aligner as said jaw members move between said open and closed positions,

both said punch and said aligner being in spaced relation above said stripper members when said jaw members are in said open position.

4,033,038

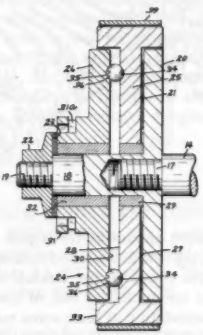
CHAIN SAW COUPLING MECHANISM

James M. Lunde, Taylors Falls, and John G. Schwartz, Jr., South St. Paul, both of Minn., assignors to Osceola Clutch & Brake Company, Minneapolis, Minn.

Filed July 30, 1976, Ser. No. 710,176

Int. Cl.² B27B *17/10;* **F16D** *15/00*

U.S. Cl. 30—382 **12 Claims**



6. In a chain saw, in combination:

a. a power driven rotary drive shaft element;

b. a radially outwardly projecting driving clutch plate fixed on said drive shaft element;

c. annular reaction means on said drive shaft element axially spaced from said driving clutch plate;

d. an axially expansible and contractible clutching assembly mounted on said drive shaft element between said driving clutch plate and said reaction means and comprising;

1. an annular driven clutch plate member journaled on said drive shaft element adjacent said drive clutch plate and having axially opposite surfaces one of which is disposed in face-to-face relationship with said drive clutch plate;

2. an actuating and output member having means for drivingly engaging a cutting chain and being journaled for rotary and axial sliding movements of said drive shaft element between the other one of said surfaces of said driven clutch plate member and said reaction means and operatively engageable with said reaction means;

3. an actuator means associated with said members for imparting relative axial clutch assembly expanding movement thereto in directions away from each other to apply frictional driving pressure to said driven clutch plate member against said driving clutch plate responsive to rotation of said driven clutch plate member at a greater speed than that of said actuating and output member in one direction of rotation thereof, said actuator means being operative to permit relative axial clutch assembly contracting movement of said members toward each other to reduce said frictional driving pressure when the speed of said driven clutch plate member is reduced below that of said actuating and output member in the same direction;

e. and means for releasably engaging said driven clutch plate member to arrest rotary movement thereof independently of said driving clutch plate.

4,033,039

DENTAL HANDPIECE

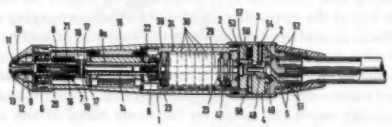
Gerd Lohn, Biberach an der Riss, and Anton Braun, Reute, both of Germany, assignors to Kaltenbach & Voigt, Biberach an der Riss, Germany

Filed Feb. 23, 1976, Ser. No. 660,315

Claims priority, application Germany, Mar. 10, 1975, 2510384

Int. Cl.² A61C *1/10*

U.S. Cl. 32—26 **17 Claims**

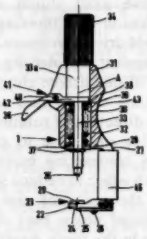


1. Dental handpiece, a drive shaft; manipulating means mounted in said handpiece, clamping tongs arranged in the front end of a drive shaft for an insertable implement, the front end of the drive shaft and the clamping tongs being axially displaceable relative to each other into a displacement end position by actuation of said manipulating means mounted in the handpiece, a piston arrangement, said tongs being displaceable out of the said displacement end position by means of said piston arrangement in the handpiece said piston arrangement comprising a plurality of piston-cylinder units arranged one behind the other in longitudinal direction of the handpiece and subjected to pressure medium action, a control device, said manipulating means being connected with said control device releasing and shutting-off pressure medium supply to the piston-cylinder units, spring means for holding said tongs in open position, and pressure rod means for removing the force of said spring means applied to said tongs.

4,033,040
CLAMPING DEVICE FOR DENTAL TOOLS

Erich Bareth, Ummendorf, and Hans Loge, Biberbach, both of Germany, assignors to Kaltenbach & Voigt, Biberach an der Riss, Germany

Filed Jan. 16, 1976, Ser. No. 649,806
Claims priority, application Germany, Dec. 10, 1975, 2555617
Int. Cl.² A61C 1/10; B25D 23/142
U.S. Cl. 32—27 **9 Claims**



1. A device for clamping and unclamping dental tools in a dental handpiece with an angled head, comprising, in combination: two-part clamping means for holding a dental tool; one part of said clamping means having a collet for holding the dental tool and another part having a driven rotary hollow shaft located in the head, said collet being movable lengthwise inside said shaft, said collet and said shaft being threadable into one another by means of an outside thread on said collet and an inside thread in said shaft selectively to obtain clamped and unclamped positions, one of said parts of the clamping means having at the tool end of the head at least one key surface accessible from the exterior; the other part of said clamping means having on the end opposite to the tool end also a least one key surface accessible from the exterior; a U-shaped carrier having a first flange with a stationary key, the latter having engaging means for engagement with said key surface at the tool end; a second flange of said carrier having an axially movable pin-shaped key projecting into the area between said flanges; an exterior attachment of said second flange with an axial hollow space, said movable key being axially movable in said hollow space against the action of spring means in a direction away from said first flange; a knob on the key end projecting from said attachment for manually rotating said movable key; and engaging means on said movable key at the opposite end of said knob for engaging said key surfaces at said opposite ends of the tool and of said head; said movable key having a handle mounted on said carrier and actuatable with hand of the operator by finger pressure applied transversely to the longitudinal axis of said movable key to axially move the latter by the same hand of the operator against the action of said spring means; wherein said handle constitutes a first arm of a two-arm acutation lever pivoted in a portion of said carrier and jutting out therefrom for easy actuation by the same hand of the operator, a second arm of said lever being fork-shaped and extending substantially transversely to the longitudinal axis.

4,033,041
STEEL LINE MEASURE GUIDE

John Henry Allums, 4206 Northwood, Anchorage, Alaska 99503

Filed May 12, 1975, Ser. No. 576,880
Int. Cl.² G01B 3/10
U.S. Cl. 33—137 R **1 Claim**

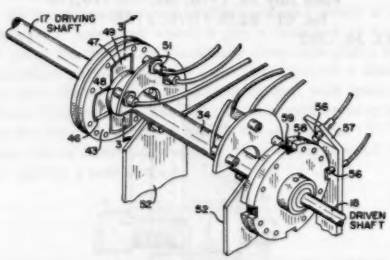
1. A device for use with a measuring tape to aid in measuring a length of pipe, comprising in combination, an elongated lower member and an elongated upper member, said lower member having a receptacle which is adapted to receive a measuring tape reel, means to hold said tape reel in said receptacle including in series, a bolt, a turnbuckle, a chain and a hook that engages a handle of the tape reel to hold the reel in the receptacle, the lower end of said lower member having a lip that engages the lower end of a pipe to be measured to hold said lower member at the lower end of the pipe, the upper end of said lower member having a second lip for engaging the side of said pipe and a plurality of guides for receiving said tape and guiding it towards said upper member, said upper member

having means to attach said tape to the upper end of the pipe, said upper member having means to hold said tape wrapped around the upper end thereof a predetermined distance, said predetermined distance being equal to the distance from the uppermost of said guides to the lower end of said lower member, so that said uppermost guide also serves as a measuring readout indicator.

4,033,042
SHAFT ALIGNMENT APPARATUS AND METHOD

Donald E. Bently, Minden, Nev., assignor to Bently Nevada Corporation, Minden, Nev.

Continuation of Ser. No. 513,726, Oct. 10, 1974, abandoned.
This application Feb. 17, 1976, Ser. No. 658,293
Int. Cl.² G01B 7/31
U.S. Cl. 33—181 R **31 Claims**



1. In an alignment apparatus for a pair of machines in a machine train having first and second rotating shafts interconnected by a flexible coupling, the flexible coupling having at least one member connected to one of the shafts and being capable of accommodating at least some misalignment of the first and second shafts, one of said first and second shafts being considered as a reference shaft and the other of said first and second shafts being considered as a movable shaft, the alignment apparatus comprising means adapted to be carried by the shafts having surfaces spaced apart circumferentially with respect to the axis of rotation of the shafts which represent the orientation of one of said shafts and serve as reference surfaces, paddle means adapted to be carried by the flexible coupling having surfaces interposed between said reference surfaces and spaced apart circumferentially with respect to the axis of rotation of the shafts and representing the orientation of said one member of the flexible coupling, and probe means for sensing the position of said reference surfaces and said last named surfaces during rotation of the same to deter-

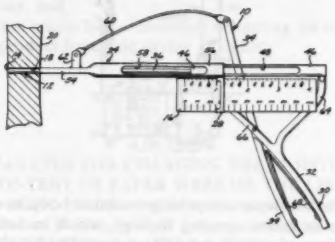
mine whether said shafts are placing on said member a force which is outside of the useful operating range of the member in the flexible coupling.

4,033,043

GAUGE FOR MEASURING LENGTH OF AN OPENING

Frank W. Cunningham, 2325 Palos Verdes Drive - West, Palos Verdes, Calif. 90274

Filed July 9, 1975, Ser. No. 594,268
Int. Cl.² A61B *5/10*
U.S. Cl. 33—143 R **8 Claims**



1. A gauge for measuring the distance between the near and far edges of an elongated opening through an element, said gauge comprising:

a rigid elongated probe including an outer extremity having a hook and an inner extremity having a first indicator means, said hook being engageable upon the far edge of the opening upon disposition of said outer extremity through the opening in the element;

an elongated member longitudinally extensible alongside said probe for engagement upon the near edge of the opening, said member including a second indicator means cooperative with said first indicator means to indicate the distance between the portions of said hook and said member in engagement with said far and near edges, respectively, to thereby indicate the length of the opening;

an elongated rod coupled to said member and extensible therewith to a projected position upon initial extension of said member, said rod having an outer extremity located adjacent said hook in said projected position to substantially fill said opening and prevent disengagement between said hook and said far edge; and

handle means connected to said probe and to said member and operative to effect relative longitudinal movement therebetween.

4,033,044

LOCK ALIGNMENT TOOL

Bertram Michaels, Williston Park, N.Y., assignor to New York School of Locksmithing, Inc., Hempstead, N.Y.

Filed July 13, 1976, Ser. No. 704,849
Int. Cl.² G01B *5/00*
U.S. Cl. 33—189 **4 Claims**

1. An alignment tool for indentifying and marking the proper location on a closure for the hole to receive the cylinder of a lock of the type having a plurality of laterally extending bolt housings and a strike with a plurality of flanges having openings to receive the bolts of the lock, the tool comprising

an alignment bar substantially in the shape of a parallelepiped and dimensioned at least at one end to fit between said flanges;

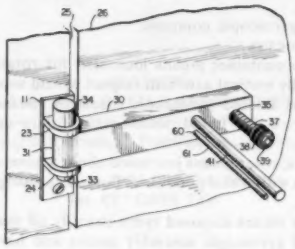
a substantially cylindrical hinge peg having a body portion and an enlarged head portion;

means in said one end of said bar defining a first opening alignable with and of a size no greater than said bolt-receiving openings in said flanges for receiving said body portion of said peg;

an externally threaded rod;

means in said bar defining a second opening spaced from the first opening and having a central axis perpendicular to the axis of said first opening and having internal threads for receiving said rod in threaded engagement, said rod being extendable from said bar to contact said closure, rotation of said rod being effective to adjust said bar so that it becomes parallel with said closure;

a punch rod having a pointed end; and



means in the bar defining a third opening for receiving said punch rod, said third opening having a central axis which is parallel with said second opening, said third opening being spaced from said first opening by a predetermined distance equal to the spacing between the bolts and cylinder of the lock;

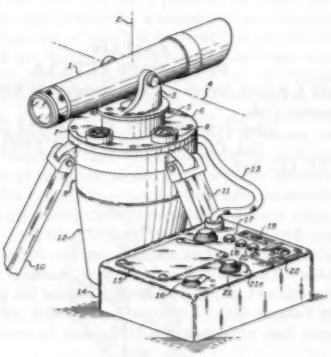
said punch rod being strikable to mark on said closure the proper point for the center of a hold to receive the lock cylinder.

4,033,045

PORTABLE SURVEYING GYROCOMPASS APPARATUS

Willis G. Wing, Glen Head, N.Y., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 621,907
Int. Cl.² G01C *19/38, 1/02*
U.S. Cl. 33—275 G **32 Claims**



1. A gyroscopic surveying compass comprising:

support means,

external casing means affixed to said support means,

sealed follow-up container means journaled for rotation normally about a vertical axis within said external casing means,

floated gyroscopic assembly means within said follow-up container means buoyantly supported by liquid contained within said follow-up container means,

gyroscope rotor means journaled about a normally horizontal axis within said floated gyroscopic assembly means,

motive means responsive to the difference between the

azimuth position of said floated gyroscopic assembly means and said follow-up container means for driving said follow-up container means into alignment with said floated gyroscopic assembly means,

sighting means journaled for free rotation with respect to said follow-up container means, angle pick-off means responsive to the difference between the azimuth position of said follow-up container means and said sighting means, and

numerical display means responsive to said angle pick-off means.

20. In a gyroscopic compass:

support means,

follow-up container means journaled for rotation about a normally vertical axis with respect to said support means,

pendulous floated gyroscopic assembly means buoyantly supported by liquid within said follow-up container means,

gyroscopic rotor means journaled about a normally horizontal axis within said pendulous floated gyroscopic assembly means,

first vane means disposed symmetrically on said pendulous floated gyroscopic assembly means and having first respective opposed electrically conductive surface means at a first part thereof.

a first pair of inductor means pending within said follow-up container means at said first part,

means for supplying an alternating electric current to said inductor means,

said inductor means forming a first pair of opposed gaps for generating eddy current flow within said respective opposed electrically conducting surface means at said first part when excited by an alternating electric current, thereby generating when said gaps are unequal, a differential restoring force tending to equalize said first pair of opposed gaps.

4,033,046

RIFLESCOPE RETICLE

Donald J. Burris, Greeley, Colo., assignor to Burris Company, Greeley, Colo.

Filed Feb. 19, 1975, Ser. No. 551,167
Int. Cl.² F41G *1/38*; G02B *27/32*
U.S. Cl. 33—297 **7 Claims**

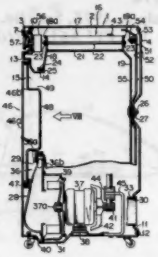
1. In a reticle for an optical sighting device, the improved aiming reference defining means which comprises: a pair of round wire filaments supported in crossed relation one behind the other, both of said filaments having portions thereof adjacent the intersection therebetween mashed to produced overlapped flattened sections of a thickness substantially less than that of the undeformed wire, said overlapped flattened sections being so located relative to one another and to the viewing axis of the sighting device that the viewer sees only the edges thereof.

4,033,047

CLOTHES DRYER

Tsuneo Kawai, Nagoya, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Aug. 5, 1975, Ser. No. 601,985
Claims priority, application Japan, Aug. 7, 1974, 49-94361
Int. Cl.² F26B *11/04*
U.S. Cl. 34—82 **13 Claims**



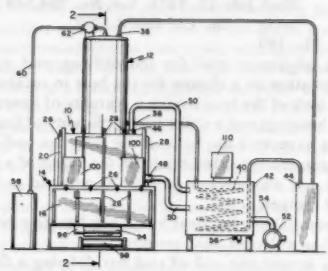
1. A clothes dryer comprising a cabinet body having at its front side an access opening through which an article to be dried is charged; a drum rotatably mounted within the cabinet body and having at its front side an access opening communicating with the access opening of the cabinet body; means for rotating the drum, a surrounding wall for defining a passage between the access opening of the drum and the access opening of the cabinet body; a door openable to gain access to the access opening of the drum and cabinet body and having an unperforated projection extending inward to define, when the door is closed, an annular air passage with respect to the surrounding wall, said annular air passage being such that the portion defined between the lower portion of the surrounding wall and of the projection is made narrower than the portion defined between the upper portions of the surrounding wall and of the projection; an exhaust duct situated below the air passage and communicating with the air passage; the portion of said annular air passage defined between the lower portion of the surrounding wall and said projection defines a restriction to prevent the passage of foreign matter into the exhaust duct; a lint retaining member provided at the exhaust duct; heating means provided within the body; and means for introducing from the rear side to the front side of the body an air heated by said heating means and guiding it through said air passage into said air duct.

4,033,048

FREEZE DRYING APPARATUS

Clayton Van Ike, 9264 Rockacres Drive, Lakeside, Calif. 92040

Filed Jan. 12, 1976, Ser. No. 648,094
Int. Cl.² F26B *13/30*, *5/06*
U.S. Cl. 34—92 **3 Claims**



1. Freeze drying apparatus, comprising:

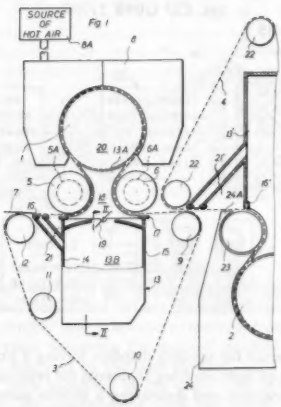
a freezing chamber with means for freezing a liquid product into powder;
a drying chamber open to and extending from said freezing chamber and subjected to the cooling therefrom;
conveyor means in said drying chamber for receiving powder from the freezing chamber and carrying the powder through the drying chamber;
a vacuum pump coupled to said drying chamber for applying a vacuum thereto;
a source of microwave radiation coupled to said drying chamber for irradiating the interior thereof;
means for controlling the microwave radiation to sublimate moisture from the powder without excessively heating the powder; and
collection means for continuously extracting the dried powder product from said drying chamber.

4,033,049

APPARATUS FOR CHANGING THE MOISTURE CONTENT OF PAPER WEBS OR THE LIKE

Christian Schiel, Heidenheim-Schnaitheim, and Hans Flämig, Heidenheim (Brenz), both of Germany, assignors to J. M. Voith GmbH, Heidenheim (Brenz), Germany

Filed Dec. 19, 1974, Ser. No. 535,049
Claims priority, application Germany, Dec. 22, 1973, 2364346
Int. Cl.² F26B *13/08*
U.S. Cl. 34—115 **15 Claims**



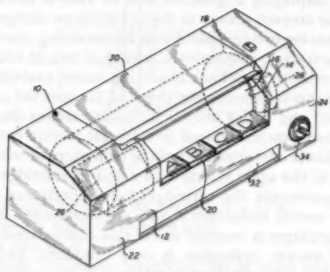
1. In an apparatus for changing the moisture content of webs which are advanced lengthwise in a predetermined direction, particularly for reducing the moisture content of paper webs, a combination comprising parallel first and second cylindrical rolls; a hollow rotary drum having a foraminous cylindrical wall, said drum being parallel with, closely adjacent to and disposed between said rolls said drum further comprising a pair of end walls and at least one partition disposed between said end walls and subdividing the interior of said drum into a plurality of compartments; and endless permeable screen having first, second and third portions respectively trained around said first roll, said drum and said second roll and directly contacting the peripheral surface of said drum, said screen further having a loop; and suction chamber disposed within said loop and having a portion disposed between said rolls and provided with an open side facing the peripheral surface of said drum intermediate said rolls, said chamber further having at least one second partition located in and subdividing said portion of said chamber into a plurality of second compartments each in register with one of said first mentioned compartments, a web to be treated being threaded between said first screen portion and said first roll, around said second screen portion, and between said third screen portion and said second roll, and said suction chamber having sealing means adjacent to said screen ahead of said first portion thereof, as considered in said direction.

4,033,050

TEACHING MACHINE HAVING RESPONSE DEPENDENT PROGRAMMING

Charles Edward Kaprelian, Franklin St., Bechtelsville, Pa. 19505

Filed Apr. 1, 1975, Ser. No. 564,046
Int. Cl.² G09B *7/06*
U.S. Cl. 35—9 R **9 Claims**



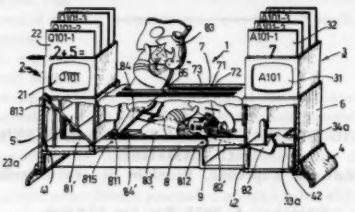
1. A device for programmed instruction comprising, in combination, a rotatable, cylindrical shaped support means, holding means on said support means, an information sheet covering substantially all of the surface of said holding means and exposing for view one of a plurality of statement and response areas each containing a statement and two or more response choices one of which is a correct choice and one or more of which are incorrect choices, user-operated response entry members corresponding in number to the number of response choices, coded means on said information sheet comprising an opaque area within each statement and response area, positioned in one of several locations, within each of said statement and response areas to indicate the correct choice of response to the statement for each of said areas, means for producing a mark within said statement and response area when an incorrect response choice is made on a response entry member, means for advancing said support means and said information sheet so as to expose subsequent statement and response areas to view, and means for automatically releasing the information sheet from said holding means by reversing the direction of rotation of said support means upon completion of viewing of the statement and response areas.

5. A worksheet for a programmed instruction device having holding means for securing the worksheet thereto wherein the user can select one of two or more responses to a statement comprising a flexible sheet of non-opaque light reflecting material having thereon a plurality of areas each containing a statement and two or more proposed responses thereto, each of said areas including a first sub-area on which is marked the coded correct response in the form of an opaque mark and a second sub-area on which only erroneous responses are automatically recorded, the coded response marks of said first sub-area consisting of an array of rectangular areas, said areas having lower optical reflectivity than the unmarked surface of the worksheet.

4,033,051
EDUCATIONAL TOY

Hsing-Ching Liu, 3F, No. 213, Chuong Ching North Road, Sec. 4,, Taipei, China /Taiwan

Filed Aug. 8, 1975, Ser. No. 602,964
Int. Cl.² G09B 3/06
U.S. Cl. 35—9 R 4 Claims

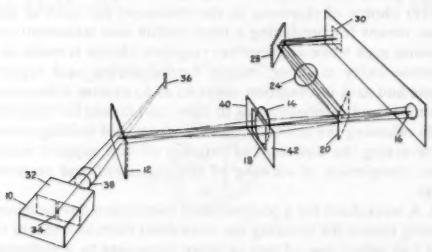


1. An educational toy comprising a plurality of matched pairs of cartridges, each matched pair including a question cartridge displaying a question and an answer cartridge displaying the correct answer to the question, an elongated body member having two compartments for receiving questions and answer cartridges, respectively, arranged one at each end of the body member, mechanical sensing means extending to the compartments for sensing the shape of the inserted cartridges, and correct and wrong answer indicating means displaceable by the sensing means housed in a central section between the compartments comprising a pair of indicators of which one is arranged to rise upon insertion of a pair of cartridges into the said compartments, the cartridges being configured such that a correct answer indication is only produced when a matched pair of cartridges is inserted in the said compartments and an incorrect answer indication is only produced when a mismatched pair of cartridges is inserted in the same compartments.

4,033,052
OPTICAL TEACHING AID

Michael Failes, Mississauga, Canada, assignor to Canadian Instrumentation and Research Limited, Mississauga and Film Opticals of Canada Limited, Toronto, both of, Canada

Filed July 6, 1976, Ser. No. 702,720
Int. Cl.² G09B 23/22
U.S. Cl. 35—19 B 11 Claims



1. A teaching aid for demonstrating the principles of colour by direct comparison of spectral distribution and the perceived colour due to said distribution, which comprises:

a. a light source emitting light;

b. a diffraction means adapted to diffract said emitted light;

c. a selective spatial filter means adapted to selectively filter said diffracted light, said filter placed at the spectrum formed by said diffracted light;

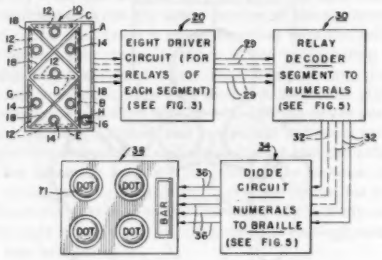
d. a focusing means placed subsequent to and near said selective filter means adapted to focus said selectively filtered light to a subsequent first viewing position;

e. a beam splitting means adapted to split said focused and filtered light into at least one split beam and one transmitted beam, the beam splitting means subsequent to the focusing means and in front of the first subsequent viewing position.

4,033,053
DIGITAL SEGMENT DISPLAY TO BRAILLE CONVERTER

Theodore T. Engler, Rte. No. 3, Box 305-B, Perry, Fla. 32347

Filed Jan. 14, 1976, Ser. No. 648,991
Int. Cl.² G09B 21/00
U.S. Cl. 35—35 A 6 Claims


EIGHT DRIVER CIRCUIT (FOR RELAYS OF EACH SEGMENT) (SEE FIG. 3)
RELAY DECODER SEGMENT TO NUMERALS (SEE FIG. 5)
DOT
BAR
DIODE CIRCUIT
NUMERALS TO BRAILLE (SEE FIG. 5)

1. A converter for reading displays having a predetermined arrangement of light emitting segments for representing alphanumeric characters and delivering a Braille pattern of raised dot and/or bar members readable by a blind person as a tactile presentation, comprising:

a. reading head means having multiple light-responsive means each corresponding with a different one of said segments and respectively disposed to face toward and respond to one associated character segment when emitting light, whereby said reading head means determines which of said segments are illuminated;

b. electric decoder means having multiple inputs respectively coupled with said multiple light responsive means, and having outputs responsive to said inputs and representing when activated decoded alpha-numeric characters;

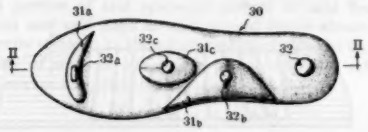
c. Braille means including a pattern with raiseable tactile members, and actuator means each connected to one of said members and operative when energized to raise the associated member in the pattern; and

d. electrical circuit means connected to the outputs of the decoder means and to said individual actuator means, and operative in response to activation of said outputs representing characters to energize appropriate actuator means to present in said pattern Braille presentations of the same characters.

4,033,054
FOOTWEAR

Tatsuo Fukuoka, No. 3-3, 2-chome, Shinminamifukushima, Tokushima, Japan

Filed Aug. 11, 1976, Ser. No. 713,596
Claims priority, application Japan, Aug. 11, 1975, 50-111838[U]
Int. Cl.² A43B 3/12, 7/22; A61F 5/14
U.S. Cl. 36—11.5 16 Claims

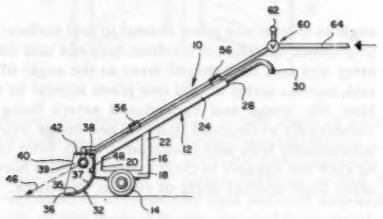


1. A footwear provided with at least one pressure projection adapted to pressure stimulate effective spots of a foot for pressure treatment, said pressure projection being provided on or near its top portion with a magnet.

4,033,055
SNOW REMOVER

Vincent Lazarecky, 28882 Gilbert Route, Warren, Mich. 48093

Filed Aug. 3, 1976, Ser. No. 711,258
Int. Cl.² E01H 5/10
U.S. Cl. 37—16 9 Claims



1. A snow removal machine, comprising:

a. a carriage assembly including ground engaging supporting wheels connected to and disposed beneath said carriage assembly and a handle extending from one end of said carriage assembly for manual control of the snow removal machine by the user thereof,

b. a snow plow mounted at the other end of said carriage assembly for engagement with the snow as the snow removal machine is advanced by the user thereof, said snow plow including a transversely extending scoop having a contoured bottom wall with an outer surface terminating at a leading edge for engagement with the snow and a pair of spaced apart side walls at each end of said bottom wall,

c. fluid outlet means mounted relative to said snow plow for providing a continuous application of two paths of heated fluid relative to said scoop, the first path being in a direction extending transversely in front of said leading edge to heat the snow, and the second path being in a direction extending transversely against said outer surface of said scoop to heat same, so as to obtain a continuous and progressive melting of the snow as the snow removal machine is advanced by the user thereof, said fluid outlet means includes:

1. a fluid member mounted between said side walls,

2. a fluid passageway extending through said fluid member,

3. a first row of spaced apart apertures extending longitudinally along said fluid member in communicating relationship with said fluid passageway to form said first flow path, and

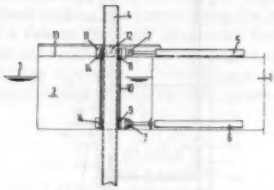
4. a second row of spaced apart apertures extending longitudinally along said fluid member in communicating relationship with said fluid passageway and in angular spaced relation to said first row, to form said second path, and

d. coupling means operatively associated with said fluid outlet means for supplying a continuous flow of fluid thereto.

4,033,056
SPUD GUIDE MEANS IN A DREDGING VESSEL

Arie Adolf Demmers, Alblasserdam, Netherlands, assignor to Bos Kalis Westminster Group N.V., Sliedrecht, Netherlands

Filed Dec. 15, 1975, Ser. No. 640,568
Claims priority, application Netherlands, Dec. 18, 1974, 7416509
Int. Cl.² E02F 3/90
U.S. Cl. 37—73 6 Claims



1. A dredger having in its after-deck a well;

in the well a horizontal guide path;

at least one spud;

spud guide means for receiving the at least one spud for vertical movement; support means for vertically supporting the spud guide means relative to the horizontal guide path in the well;

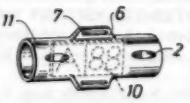
at least two vertically spaced horizontal jacks, said jacks being at one end fixed to the vessel and having the other end connected to the spud guide means in spaced relationship;

control means in the vessel for controlling the jacks independently of each other.

4,033,057
MARKING TAPES FOR MARKING ARTICLES

Walther Jaffe, Lidkoping, Sweden, assignor to Lebema Eledtriska Aktiebolag, Nykoping, Sweden

Filed May 28, 1975, Ser. No. 581,959
Claims priority, application Sweden, May 29, 1974, 7407122
Int. Cl.² G09F 3/18
U.S. Cl. 40—21 R 7 Claims



1. A marking device for marking articles such as electric cables, pipe conduits and the like, and comprising at least one marking plate carrying marking indicia, a support for said marking plate in the form of a resilient, flexible, transparent tubular hose the greatest inner dimension of which is less than the width of said marking plate, said tubular hose assuming a shape of circular cross-section symmetrical about its center axis when relaxed, said marking plate being inserted into the

cover thereby resiliently distorting said cover from its symmetrical relaxed shape whereby said marking-plate is positively retained in said hose with the indicia of the marking plate readable through the support, means for attachment of said support and inserted marking plate to the article to be marked, said attachment means including spaced holes in said tubular hose along at least one straight line in the peripheral surface of said hose in parallel relation to the center axis thereof, and fastening elements for cooperation with said holes to attach said hose to the article to be marked.

4,033,058

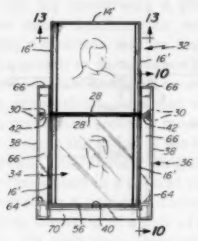
PICTURE DISPLAY STAND

Geroge F. Lyman, Weston, Mass., assignor to Data Packaging Corporation, Cambridge, Mass.

Continuation of Ser. No. 536,815, Dec. 27, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 667,132

Int. Cl.² G09F 11/14

U.S. Cl. 40—97 **19 Claims**



1. A picture display device comprising:

a plurality of rectangular picture frames, each formed from a plurality of frame members;

hinge means connecting one of the frame members of each frame to a corresponding frame member of each adjacent frame;

a substantially flat, transparent panel extending across the face of each frame and being connected at its opposed ends to a pair of opposite frame member of each frame, the panel being contained within the region defined by the frame, the side edges of the panel being spaced from the other pair of opposite of said frame members; and

a pair of ribs secured to each frame and extending adjacent each of the side edges of the panel, each of the ribs overlying one of the spaces defined between the side edges of the panel and said other opposite frame members, each of the ribs lying in a plane which is offset from that in which the panel is disposed, thereby enabling a pair of pictures to be removably retained within each frame and in back-to-back relation to expose each of said pictures at opposite faces of each of the frames.

4,033,059

DOCUMENTS OF VALUE INCLUDING INTAGLIO PRINTED TRANSITORY IMAGES

Robert Gordon Hutton, Ashton, and Trevor Merry, Ottawa, both of Canada, assignors to American Bank Note Company, New York, N.Y.

Continuation of Ser. No. 278,980, Aug. 9, 1972, abandoned. This application Apr. 18, 1975, Ser. No. 569,563

Claims priority, application Canada, July 6, 1972, 146533

Int. Cl.² G09F 7/16

U.S. Cl. 40—137 **22 Claims**

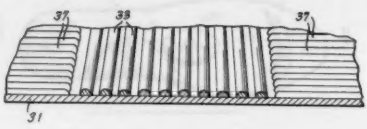
1. A security document or the like, comprising:

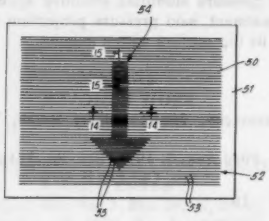
a. a substrate having a surface;

b. an imprint comprising spaced pattern elements raised from said surface, said raised elements being inked with a color visibly contrasting with the intervening portions of said surface, said intervening portions being visible between said pattern elements when viewed along a line of sight perpendicular to said surface;

c. said imprint including at least one image array and a background array, each array comprising a multiplicity of said pattern elements;

d. said image array and said background array being respectively disposed, in relation to said surface, for occluding their respective intervening portions of the surface in different degrees as the imprint is viewed at an oblique





angle in at least one plane normal to said surface, thereby to produce variation in contrast between said one image array and said background array as the angle of view of said imprint varies in said one plane normal to said surface, the image and background arrays being further respectively so disposed that said one image array blends substantially with said background array from one angle of view but appears in clear contrast to said background array from another angle of view in said plane.

4,033,060

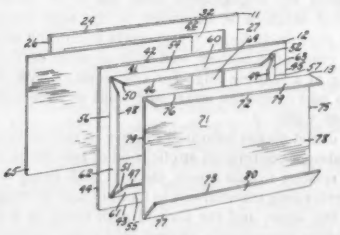
PICTURE FRAME CONSTRUCTION

Simone P. Lawrence, 33 E. 22nd St., New York, N.Y. 10010

Continuation-in-part of Ser. No. 607,124, Aug. 25, 1975, abandoned. This application Mar. 8, 1976, Ser. No. 654,958

Int. Cl.² G09F 1/12

U.S. Cl. 40—152.1 **9 Claims**



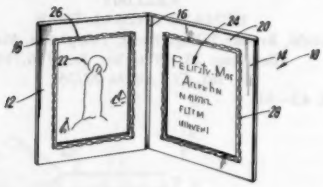
1. An improved picture frame construction for mounting photographic prints and the like comprising: a first planar frame element of generally rectangular configuration and defining a first rectangular through opening therein, said first frame element having rearward surface; a second planar frame element of overall size and configuration corresponding to that of said first frame element and having a peripheral portion joined in laminar relation to said rearward surface of said

first frame element, said second frame element having a second rectangular through opening therein of larger dimensions than said first opening; whereby said second frame element partially overlies said rearward surface and leaves an exposed portion; said second frame element having a plurality of flaps foldably connected to said peripheral portion at the border of said second opening, and extending rearwardly from the plane thereof; and a third print-retaining element including a rectangular main body portion of size corresponding to that of said second opening, and selectively engaged between said exposed portion of said rearward surface of said first frame element and said flaps of said second frame element to be resiliently retained by the latter; said third element including a plurality of surfaces adapted to lie in congruent relation to said flaps on said second element.

4,033,061
DISPLAY FOLDER

Thomas B. Schulhof, and Ronald M. Schulhof, both of New York, N.Y., assignors to Quadriga Art Co., Inc., New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,321
Int. Cl.² G09F *1/10*
U.S. Cl. 40—158 R **12 Claims**



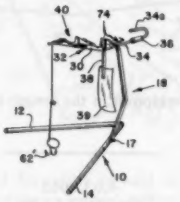
1. A display member comprising a base sheet of substantially rigid material, a sheet of display material having a display on one side thereof, first adhering means securing the opposite side of said sheet of display material to said base sheet, a top sheet of substantially rigid material disposed on said one side of said sheet of display material to sandwich said sheet of display material between said base and top sheets to define a panel assembly, said top sheet having an aperture therethrough larger than said display and smaller than said sheet of display material to define a frame around said display, second adhering means securing said one side of said display material to said top sheet, an overlay cover material completely enclosing said panel assembly and being continuous at the borders thereof, and third adhering means securing said cover material to the entire outer surface of said base sheet and the entire outer surface of said frame portion of said top sheet.

4,033,062
FISHING JIGS

Nick Denecky, 302 23 St. South, Lethbridge, Alberta, Canada

Filed Dec. 23, 1975, Ser. No. 643,828
Int. Cl.² A01K *97/10*
U.S. Cl. 43—15 **7 Claims**

1. A fishing jig comprising:
1. a portable support having an elevated, relatively stationary horizontal support bar,
2. a fishing rod rockingly mounted on said bar intermediate the ends of said rod and at the approximate balance point thereof;
3. hook setting means carried by the outer end of said rod comprising:
a. an element pivoted to said rod and having an outer end which is spring biased to an elevated position relative to said rod;
b. means for cocking said element so that its outer end is retained depressed relative to said rod;
c. trigger means carried by said spring biased element for releasing said cocking means upon a downward pull on said trigger means; and
d. means for suspending from said trigger means a fishing line with a hook thereon;

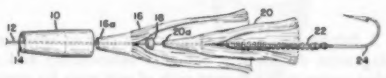


4. and stop means carried by said support and spaced from but in the rocking path of said rod and engageable by said rod to limit rocking movement thereof in response to the pull of a fish on the hook suspended from said trigger means so as to provide a positive reaction against said pull for effecting operation of said trigger means and the consequent release of said cocking means.

4,033,063
FISH LURE

Norman W. Mize, 7154 London Lane, Apt. C, Lemon Grove, Calif. 92045

Filed Jan. 19, 1976, Ser. No. 650,296
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.05 **7 Claims**



1. A fish lure comprising: a body having a truncated cone portion joined to a cylindrical portion, said body having an axial hollow therethrough of substantial diameter through which a leader for a hook assembly may be freely passed and simultaneously allow the free flow of water through said body hollow around said leader towards said hook assembly; at least one skirt having a hollow, truncated cone shaped front portion with a plurality of strands extending from the periphery of said front portion, the nose opening said front portion being of a diameter sufficient to freely receive said leader and simultaneously to allow free flow of water from said body hollow through the interior of said front portion; an flow diverter means slidably placed on said leader for insertion into said front portion of said skirt to hold said front portion in contact with the surface of said body hollow and being formed to direct the flow of water entering said front portion as a plurality of streams against the inner surfaces of said strands to move said strands outwardly.

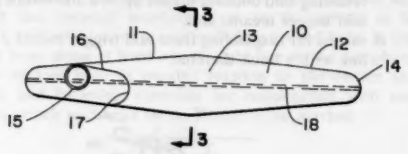
4,033,064
MINNOW MOOCHER

Allan J. Phillips, 1928 Buenavista, Comox, British Columbia, Canada

Filed Oct. 28, 1975, Ser. No. 626,176
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.39 **4 Claims**

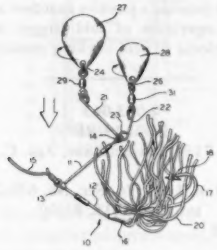
1. A fishing lure simulating a minnow comprising a long, narrow, slightly tapered symmetrical arcuate body cast about an insert provided with holes for securing, said body having rounded ends and a uniform radius in cross-section, the body

being symmetrically tapered in the longest direction about a lengthwise axis; and symmetrically tapered from a maximum



dimension at the midpoint in the length towards the rounded ends.

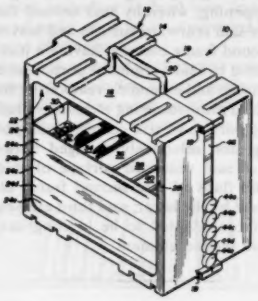
4,033,065
FISHING LURE
Jesse Max Shannon, 3445 Pratt Ave., Lincolnwood, Ill. 60645
Filed Aug. 16, 1976, Ser. No. 714,815
Int. Cl.² A01K *85/00*
U.S. Cl. 43—42.13 **1 Claim**



1. A fishing lure comprising, a first pair of rearwardly diverging arms disposed in coplanar relationship and an eye member connecting adjacent ends of said arms for connection of a fishing line, weight means secured to one of said arms, hook and barb means carried by said weight means, a generally V-shaped member having legs of unequal lengths and pivotally connected at its apex to the other of said arms, a spinner swivelly connected to the end of each leg of said generally V-shaped member, one of said spinners having a larger surface area than the other of said spinners, said V-shaped member being free to swing relative to said pair of arms so that when the lure strikes water and begins a downward descent the spinners are caused to rotate about respective vertical axes thereby slowing the rate of descent of the lure while maintaining the diverging arms in a substantially vertical plane and in an attitude wherein the hook and barb means are disposed generally horizontally during such descent.

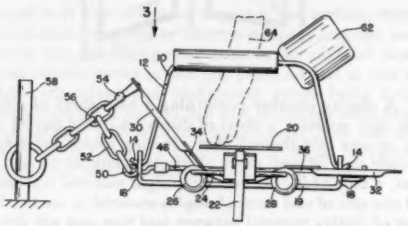
4,033,066
FISHING TACKLE BOX
Paul J. Morcom, Rte. No. 1, Box 235, Henderson, Tex. 75652
Filed July 18, 1975, Ser. No. 597,216
Int. Cl.² A01K *97/04*
U.S. Cl. 43—54.5 R **22 Claims**

1. A tackle box comprising:
a substantially rectangular housing having a bottom wall, a top wall, opposing side walls and a front and back wall,
a plurality of open topped trays mounted within said housing for solely vertical movement within said housing,
means on said housing defining a path for vertical movement of said trays,
said trays having compartments for receiving tackle devices, and
means for allowing or blocking access to any of said trays by



selectively positioning said trays in any of a plurality of vertical positions in said housing.

4,033,067
HUMANE ANIMAL TRAP
John Kuehl, Brooks Village Road, Templeton, Mass. 01468
Filed Aug. 23, 1976, Ser. No. 716,760
Int. Cl.² A01M *23/26*
U.S. Cl. 43—90 **10 Claims**

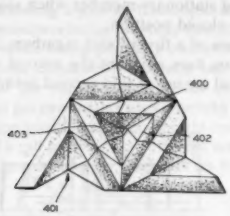


1. A humane animal trap comprising a frame, a pair of pivoted jaws on the frame, a pair of springs, a pair of jaw closers, each spring being separately operatively associated with a single one of said jaw closers, the jaw closers being located at opposite ends of the jaws,
means on said jaws forming a sleeve, said sleeve being at one end of said jaws adjacent to one of said closers,
a pan, a latch for the pan, means causing the release of the one spring to activate the one of the jaw closers while the other jaw closer remains locked, and separate means for releasing said latter jaw closer.

4,033,068
STRUCTURAL MODULE
Jack J. Skillman, 727 E. 60th St., Chicago, Ill. 60637
Filed Sept. 8, 1975, Ser. No. 611,346
Int. Cl.² A63H *33/16*; **A42B** *1/18*
U.S. Cl. 46—1 L **14 Claims**

1. A modular form made from material including a pair of oppositely directed points and a plurality of interior pockets, the points and pockets having complementary and non-perpendicular configurations, whereby a point on one module fits into a pocket on another module with said modules fitting

together in a non-perpendicular configuration, said modular form fitting together in an open assembled configuration



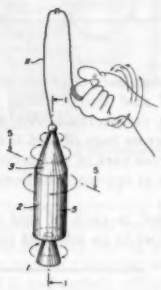
which does not inherently close upon itself in polyhedra with six or less faces.

4,033,069

MELODY BIRD INSTRUMENT

Rurico Arzola, Calle San Martin, No. 69-Urb. Villa Sol, Mayaguez, P.R. 00708

Filed July 31, 1975, Ser. No. 600,912
Int. Cl.² A63H *5/00*
U.S. Cl. 46—52 **17 Claims**



1. An instrument for simulating sounds of singing birds and nighttime animals and insects, said instrument comprising air chamber means for circulating air therethrough upon relative movement of said air chamber means with respect to the air, said air chamber means including an elongated aperture into which the air enters said air chamber means, said elongated aperture having a pair of beveled edges, each having a bevel angle of 30° into the interior of said air chamber means, and a second aperture through which the air circulating within said air chamber means exits, thereby producing melodious and harmonious sounds; and means for controlling the movement of said air chamber means with respect to the air.

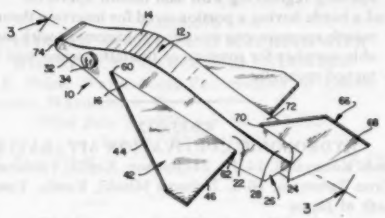
4,033,070

TOY FOAM GLIDER

Ned Strongin, 936 Willow Bend Lane, Baldwin, N.Y. 11510; A. Edward Fogarty, and Bonnie Rose Fogarty, both of 3513 School Ave., Sarasota, Fla. 33579

Filed July 2, 1975, Ser. No. 592,609
Int. Cl.² A63H *27/00*
U.S. Cl. 46—79 **9 Claims**

1. A toy foam glider including a fuselage made of a soft, bendable, flexible and resilient foam material, a wing member comprising a thin flat panel of flexible light-weight plastic material, said fuselage having a width appreciably greater than the thickness of said wing member, means for removably mounting said wing member on said fuselage, said mounting means comprising a longitudinal slot extending through the width of said fuselage and sized to receive and retain a central portion of said wing member therein, said wing member having an over-all width greater than the length of said slot, and said central portion having a width substantially equal to the length of said slot, and a balance weight mounted on said



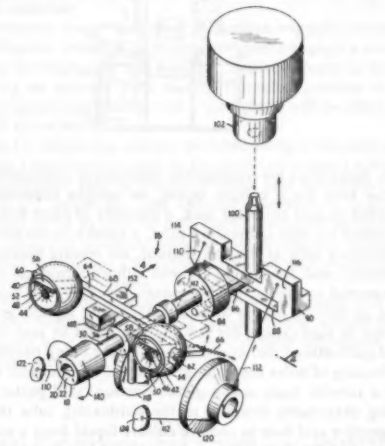
fuselage and located forwardly of said wing member, said balance weight comprising a central cylindrical portion and a pair of end flanges, said fuselage having a hole extending transversely therethrough and receiving the cylindrical central portion of said balance weight.

4,033,071

SUCKING DOLL WITH CHEEKFLEXING MEANS OPERATED BY TURNING BOTTLE

Ned Strongin, 936 Willowbend Lane, Baldwin, N.Y. 11510; A. Edward Fogarty, and Bonnie Rose Fogarty, both of 3513 School Ave., Sarasota, Fla. 33579

Filed Mar. 18, 1976, Ser. No. 668,239
Int. Cl.² A63H *13/02*
U.S. Cl. 46—118 **8 Claims**



1. A doll assembly comprising a hollow head portion having a mouth aperture and a pair of flexible cheek portions,
a frame immovably mounted within said head portion,
a rotatable member mounted on said frame for rotary movement about a transverse axis extending between the front and rear walls of the doll head portion, said rotatable member being positioned to be accessible through said mouth aperture,
an actuator member movably mounted on said frame,
means operatively coupling said rotatable member with said actuator member for movement of the latter to an actuating position when said rotatable member is turned in a first selected direction,
first coupling means connecting said actuator member to said flexible cheek portions for flexing the latter inwardly when said actuator member is moved to said actuating

position by turning movement of said rotatable member in said selected direction,

said rotatable member having an end portion located adjacent to said mouth aperture, said end portion having an opening registering with said mouth aperture,

and a bottle having a portion sized for insertion through said mouth aperture into coupling engagement with said rotatable member for rotation of the latter when said bottle is turned manually.

4,033,072

HYDROPONIC CULTIVATION APPARATUS

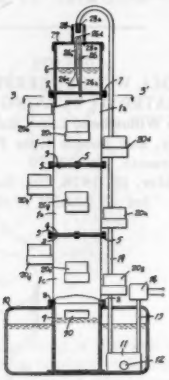
Hitoshi Kobayashi, 14-15, Tenjinchou, Koyfu, Yamanashi, and Jirou Tatemoto, 10-6, 2 chome Misaki, Koufu, Yamanashi, both of Japan

Filed Dec. 29, 1975, Ser. No. 645,076

Claims priority, application Japan, Dec. 28, 1974, 49-149173; Dec. 28, 1974, 49-149172; Feb. 10, 1975, 50-016344; Feb. 13, 1975, 50-017437

Int. Cl.² A01G *31/00*

U.S. Cl. 47—62 **5 Claims**



1. Apparatus for hydroponic cultivation comprising a collector tank for a culture liquid, an upright cultivating tube erected on said collector tank, a plurality of plant holder units mounted on said cultivating tube, a cistern mounted on said cultivating tube at the top thereof, air mixing means in said collector tank for mixing air with culture liquid, an air pump connected to said air mixing means, a supply pipe connecting said air mixing means to said cistern, and siphon generating means in said cistern for feeding the liquid in said cistern to said cultivating tube, said cultivating tube being provided with a plurality of holes therealong, each plant holder unit comprising a tubular body and a gutter portion, said gutter portion being detachably inserted in the cultivating tube through a respective said hole to receive culture liquid from a unit thereabove and for discharging culture liquid to a unit therebelow.

4,033,073

SHUTTER, GRILLE OR THE LIKE

Robert T. Bogan, P.O. Box 26208, Albuquerque, N. Mex. 87125

Filed Jan. 9, 1976, Ser. No. 647,660

Int. Cl.² E06B *7/02*

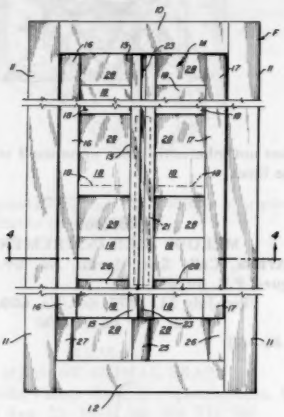
U.S. Cl. 49—38 **6 Claims**

1. A shutter, grille or like, comprising:

a stationary member having vertically and equally spaced cross bars connected by upright rail means including an upright center rail;

a movable member provided with corresponding vertically and equally spaced cross bars connected by upright rail means including an upright center rail, said cross bars of said movable member being in alignment with said cross bars of said stationary member when said movable member is in an open position and said cross bars of said movable member covering the spaces between said cross bars of said stationary member when said movable member is in a closed position;

said rail means of a first of said members being on the side of said cross bars adjacent the second of said members and said rail means of said second member being on the



side of said cross bars opposite said first member, said center rail of said first member forming tongue and groove sliding connections with said second member, whereby said cross bars of said first member closely approach said cross bars of said second member;

longitudinal slots at opposed positions in said opposed center rails; and

a magnet disposed in each of said slots for holding said movable member in an adjusted position.

4,033,074

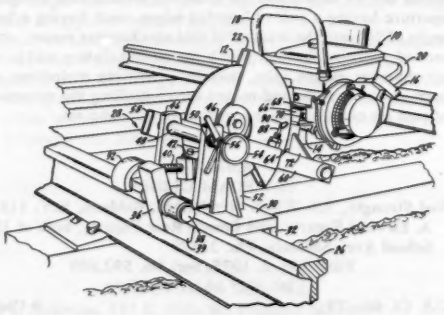
PORTABLE RAIL SAW

William M. Lutts, Nashville, Tenn., assignor to Safetran Systems Corporation, Louisville, Ky.

Filed Oct. 28, 1975, Ser. No. 626,359

Int. Cl.² B24B *23/00*

U.S. Cl. 51—178 **6 Claims**



1. A portable rail saw assembly including saw means having a rotatable blade, a clamp adapted to attach to a rail to be cut, an axial locater movably mounted on said clamp, means pivotally attaching said saw means to said axial locater, means for moving said axial locater and saw means in a direction generally parallel to the rails and relative to the clamp for positioning said saw means for cutting a rail, means permitting move-

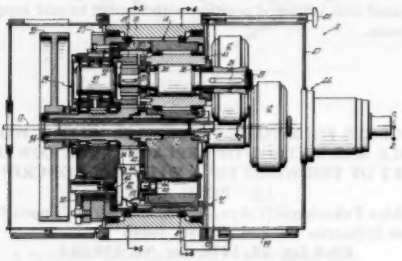
ment of said saw means toward and away from said axial locater and clamp and providing for swing-over movement of said saw means from one side of the rail to be cut to the opposite side including a pair of telescopic members, one of said telescopic members being pivotally connected to said saw means and the other being pivotally connected to said axial locater, the pivotal connection between said one telescopic member and said saw means providing for movement of said saw means about perpendicular axes whereby said saw means is capable of being positioned in an upright operating position on both sides of a rail to be cut, and detent means for holding said saw means in said upright positions on both sides of the rail.

4,033,075

MECHANISM FOR ADJUSTABLY POSITIONING PLANETARY MACHINING ELEMENTS

Robert C. Verbickas, Wolcott, Conn., assignor to The Fenn Manufacturing Company, Newington, Conn.

Filed Oct. 6, 1975, Ser. No. 619,902
Int. Cl.² B21C *43/04*
U.S. Cl. 51—80 A **14 Claims**



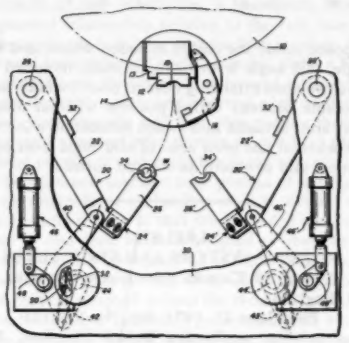
1. In a planetary machining apparatus having a fixed rotor support, a rotor rotatably mounted on the rotor support, at least one drive spindle assembly having a rotary spindle support mounted on the rotor for angular adjustment about an axis generally parallel to and radially offset from the rotor axis and a drive spindle rotatably mounted on the spindle support for rotation about an axis parallel to and radially offset from the axis of the spindle support, a machining element mounted on each drive spindle, adjustment means for angularly adjusting each rotary spindle support for radially adjusting the respective spindle and machining element relative to the rotor axis, and drive means for rotating the rotor and each drive spindle for respectively providing planetary movement of each machining element about the rotor axis and rotation of each machining element about its spindle axis, the improvement wherein the adjustment means comprises bidirectional motor means operative in opposite directions thereof and mounted on the rotor for rotation therewith, transmission means operatively connecting the motor means to each spindle support for angularly adjusting each spindle support in its opposite angular directions by operation of the motor means in its opposite operative directions respectively, stationary selector means and connector means operatively connecting the selector means to the motor means, the selector means and connector means being operable for selectively operating the bidirectional motor means in each operative direction thereof during rotation of the rotor, said drive means comprising a planetary system having a first gear mounted for rotation coaxially with and relative to the rotor, an internally and externally toothed planetary ring gear for each drive spindle assembly, each ring gear being rotatably mounted on said drum for rotation about an axis coaxial with the respective rotary spindle support and with the external teeth of said ring gear in engagement with said first gear for planetary movement of said ring gear about the rotor axis upon rotation of the rotor, and a secondary planetary drive pinion secured to each drive spindle coaxially therewith and in engagement with the internal teeth of the respective ring gear for planetary motion relative to the ring gear axis upon angular adjustment of the respective spindle support.

4,033,076

CYLINDRICAL GRINDING MACHINE WITH WORKPIECE LOADER AND UNLOADER

Ralph E. Price, Waynesboro, Pa., assignor to Landis Tool Company, Waynesboro, Pa.

Filed June 3, 1976, Ser. No. 692,703
Int. Cl.² B24B *41/00*
U.S. Cl. 51—105 R **5 Claims**



1. A cylindrical grinding machine comprising
workpiece clamping means including a throwblock and a jaw member,
a workpiece loader including workpiece engaging means,
a workpiece unloader including workpiece engaging means,
means for displacing said loader workpiece engaging means along an arcuate path from a retracted position to an advanced position whereat a workpiece will be placed in said throwblock,
means for displacing said jaw member along an arcuate path from a retracted position to an advanced position whereat a workpiece may be clamped within said throwblock,
means for displacing said unloader workpiece engaging means along an arcuate path from a retracted position to an advanced position, whereat said workpiece engaging means will engage a workpiece clamped within said workpiece clamping means,
said arcuate paths of said jaw member and loader and unloader workpiece engaging means being substantially tangent to a single straight line at their respective advanced positions.

4,033,077

PORTABLE POWER ANGLE TOOL AND SWITCH MECHANISM

Nelson Sherwood Chester, Reisterstown; Thomas Cecil Laughon, Columbia, and William Frank Sindelar, Towson, all of Md., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Filed Apr. 8, 1976, Ser. No. 675,119
Int. Cl.² B24B *23/00*; H01H *3/20*
U.S. Cl. 51—170 T **28 Claims**

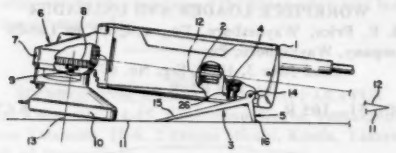
1. A portable, power angle tool comprising:
a housing;
operating means for performing work on a workpiece; said operating means being mounted on said housing so as to conjointly define therewith an angular structure defining an enclosed angle, said angular structure being configured so that the angle tool can be manually placed to rest on a rest surface in such a manner that said enclosed angle and the rest surface conjointly describe a triangle;

power supply means for supplying energy to said operating means; and,

a switch mechanism including:

switch means for interrupting the flow of energy to said operating means; and,

an angle lever mounted on said angular structure so as to be



disposed inside the region included within said enclosed angle, said angle lever being pivotally mounted so as to have two arms extending from its pivot location and being pivotable between a first position whereat one of said lever arms actuates said switch means and a second position whereat said lever arms of said angle lever conjointly support said structure on the rest surface.

4,033,078

HOUSING SYSTEMS AND STRUCTURES

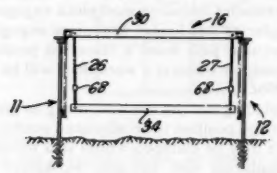
John R. Prewer, 82 Thomas More House, Barbican, London E.C.2, England

Filed June 25, 1975, Ser. No. 590,101

Claims priority, application United Kingdom, June 28, 1974, 28892/74

Int. Cl.² E04H *1/12*

U.S. Cl. 52—79.5 **21 Claims**



1. A housing structure comprising two parallel, laterally spaced and generally horizontal fixed load supporting longitudinal members and a plurality of separate housing units mounted between said longitudinal members, each of said housing units comprising a load supporting roof and a floor, the ends of said roof resting on, extending between, and being supported by said longitudinal members, and a plurality of load supporting members, said floor being suspended from adjacent the ends of said roof by said load supporting members, said load supporting members allowing for the adjustment of the spacing between said roof and said floor and for the collapse of said roof against said floor for transport.

4,033,079

REPLACEMENT HOLD-DOWN CLIP FOR SUSPENDED-CEILING PANELS

Eason Cross, Jr., 2309 Glasgow Road, Alexandria, Va. 22307

Filed Jan. 30, 1975, Ser. No. 545,553

Int. Cl.² E04B *5/57*

U.S. Cl. 52—99 **12 Claims**

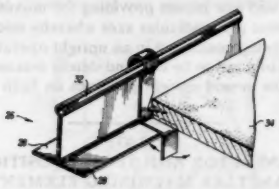
1. A ceiling panel hold-down clip of the type in which a portion thereof engages a supporting beam, said clip comprising:

a vertical support rib;

releasable engaging means connected with said support rib at one end thereof for engaging said supporting beam;

securing means connected with said support rib for attachment to a panel; and

manipulating means for manipulating an attached panel into a desired position with respect to said support beam, said manipulating means comprising a tab extending away from and substantially normal to the other end of said



support rib, said tab having its terminal end bent such that the end portion of said tab extends downwardly away from the bottom surface of said ceiling panel when said securing means is attached to said panel thereby serving as a manipulating means for manipulating an attached panel into a desired position with respect to said support beam.

4,033,080

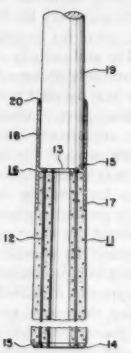
CONCRETE POLE TO BE CONNECTED WITH A WOOD POLE AND METHOD OF REPLACING THE LOWER PART OF THE WOOD POLE WITH THE CONCRETE POLE

Yoshikiyo Fukushima, Tokyo, Japan, assignor to Nippon Concrete Industries Co. Ltd., Tokyo, Japan

Filed Jan. 20, 1976, Ser. No. 650,664

Int. Cl.² E04C *3/34*; **E02D** *5/22*; **B23P** *7/00*

U.S. Cl. 52—223 R **4 Claims**



1. A means for connecting a round concrete pole to a second pole comprising:

a concrete pole;

a cylindrical metal connecting tube, one end of said connecting tube telescoped over one end of said concrete pole;

a first metal plate within said connecting tube and integral therewith, the flat surfaces of said first plate transverse to the longitudinal axis of said connecting tube, said first metal plate positioned against said pole end, the contiguous surfaces of said concrete pole and said connecting tube being integral by the process of molding said concrete within said connecting tube;

a second circular plate at the other end of said concrete pole;

headed bolts with nuts extending through said concrete

between said first and said second plates to compress said concrete pole between said plates; and

the other end of said connecting tube being open to receive said second pole.

4,033,081

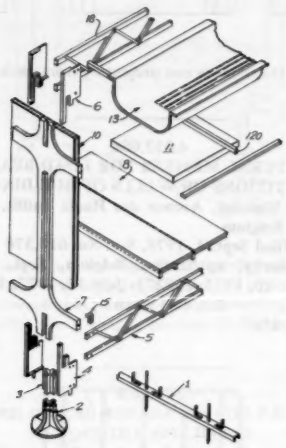
MODULAR BUILDING SYSTEM

Fred M. Perkins, Jr., 713 W. Second, Little Rock, Ark. 72201

Filed May 16, 1975, Ser. No. 578,193

Int. Cl.² E04B *1/00*

U.S. Cl. 52—263 **24 Claims**



1. A modular building system, which comprises:

a substantially planar elongated frame member for providing vertical structural rigidity to the modular building system, said frame member having means for providing horizontal structural rigidity to said system, said means comprising a pair of members which extend integrally and transversely from said frame member near the upper and lower ends of said frame member, each of said ends having a longitudinal slot formed therein for slidable engagement with means for supporting said frame member.

4,033,082

PLATE BLOCK

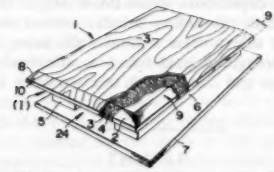
Eiji Tashiro, Hoya, Japan, assignor to Tokyo Plywood Kabushiki Kaisha, Tokyo, Japan

Filed July 31, 1975, Ser. No. 600,765

Claims priority, application Japan, Aug. 12, 1974, 49-92150

Int. Cl.² E04C *1/00*

U.S. Cl. 52—316 **2 Claims**



1. A plate block comprising a decorative sheet, said decorative sheet comprising a substratum and a single face veneer sheet, said substratum having a front face and a rear face, said front face being smaller than said rear face such that beveled edge portions are formed on said substratum between said front and rear faces, said beveled edge portions extending about the entire periphery of said substratum, said beveled edge portions of said substratum being inclined from twenty to seventy degrees relative to said front and rear faces thereof, said single face veneer sheet having an overall area at least equal to the sum of the area of said front face of said substratum and the total area of said beveled edge portions of said substratum, said single face veneer sheet having peripheral edge portions, said single face veneer sheet being bent to conform to said beveled edge portions of said substratum with the bent section of said single face veneer sheet having means defining a notched section of facilitate adapting the single face veneer sheet to an abutting relationship with said beveled edge portions of said substratum, said single face veneer sheet being joined by adhesive means to said front face and to said beveled edge portions of said substratum, a base plate disposed in spaced parallel relationship relative to the rear face of said decorative plate, at least one intermediate member disposed between said base plate and said decorative plate, a first edge portion of said base plate projecting beyond a first edge portion of said decorative plate and a second edge portion of said decorative plate opposite said first edge portion thereof projecting beyond a second edge portion of said base plate, said second edge portion of said base plate being opposite said first edge portion thereof, said first edge portion of said base plate facilitating assembly of a plurality of plate blocks in juxtaposed and abutting array in that the first edge portion of the base plate of one plate block is adapted to abut the second edge portion of the base plate of another juxtaposed plate block and the first edge portion of the decorative plate of said one plate block is adapted to abut the second edge portion of the decorative plate of said other juxtaposed plate block, said projecting first edge portion of said base plate being readily accessible to have fastening means applied thereto for attaching said one plate block to a beam element or the like prior to placing said other plate block in said juxtaposed and abutting position.

4,033,083

BACK FASTENING OF MOBILE HOME CEILING BOARDS

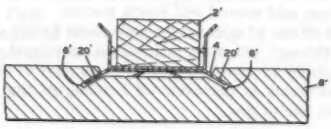
Thomas W. Fritz, East Petersburg; Charles F. Gilbo, Lancaster, and Norman A. Johnson, Lititz, all of Pa., assignors to Armstrong Cork Company, Lancaster, Pa.

Continuation of Ser. No. 267,431, June 29, 1972, abandoned.

This application Mar. 29, 1976, Ser. No. 672,547

Int. Cl.² E04B *5/52*

U.S. Cl. 52—484 **1 Claim**



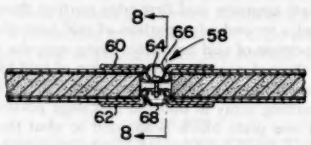
1. A back fastening means for fastening a ceiling board to overlying structural ceiling members wherein the ceiling board has a back surface and a front surface which is visible to view and both surfaces are in a horizontal plane, slot means are provided in the back surface of the ceiling board at spaced intervals along the ceiling board, said slot means in the ceiling board are at least two oppositely directed, outwardly extending cuts within the ceiling board at a small angle relative to the plane of the back surface of the ceiling board and spaced from the back corners of the ceiling board, and fastening means are connected to the overlying structural ceiling members, said fastening means in a resilient spring clamp means which engages the sides of a joist which constitutes the overlying structural ceiling members, said clamp holding the fastening means in position relative to the joist, said fastening means having outwardly extending flange means which are positioned so that the flange means are inserted into the slot means and are

slideably movable along the slot means of the ceiling board, thereby holding the ceiling board in position relative to the structural members of the ceiling and permitting the ceiling board to be moved relative to the fastening means, said flange means extending outwardly from the lower corners of the clamp means, and said clamp means further being a separate component from the flange means and said flange means being releasably connected to the clamp means.

4,033,084
WALLBOARDS

Frank L. Shiflet, Waynesboro, Va., assignor to Hopeman Brothers, Inc., New York, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,750
Int. Cl.² E04B *1/68, 1/94*
U.S. Cl. 52—573 **3 Claims**



1. A wall system comprising at least two wallboards arranged in edge-to-edge relationship to form part of a wall, and clamping means for securing said wallboards in said relationship, said clamping means comprising first and second clamping elements;

the first clamping element having first means for engaging the face of one wallboard on one side of the wall, second means for engaging the face of the other wallboard on said one side of the wall, and web means connecting said first and second means;

the second clamping element having third means for engaging the face of said on wallboard on the opposite side of the wall, fourth means for engaging the face of the other wallboard on said opposite side of the wall, and web means for connecting said third and fourth means; and

fastener means connecting said webs to each other and effecting clamping of one of said wallboards between said first and third means and the other of said wallboards between said second and fourth means;

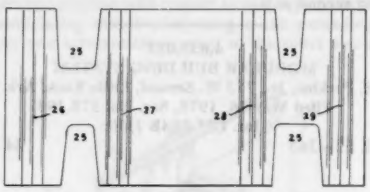
the web of one of said clamping elements having elongated slots through which the fastener means extend, said slots permitting relative longitudinal movement of the clamping elements in the event of bending of the clamping means due to fire.

4,033,085
BRICK TIE

Norman William Haines, 71 Saltly St., South Kingsville, Victoria, Australia

Filed Apr. 3, 1975, Ser. No. 564,980
Claims priority, application Australia, Apr. 4, 1974, 7156/74
Int. Cl.² E04B *1/38*
U.S. Cl. 52—698 **5 Claims**

1. A brick tie comprising a sheet metal strip having two opposite longitudinal edges, two notches in each longitudinal edge one adjacent each end thereof, each notch having a different nominal width and shaped to receive the edge portion of a flange of a structure member, two transverse ridges formed in the strip one projecting from each face of the strip one located between each end of the strip and the adjacent notches, and two further transverse ridges formed in the strip

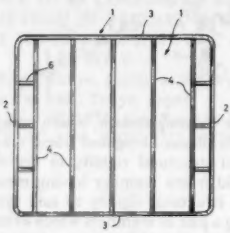


intermediate the notches one projecting from each face of the strip.

4,033,086
STRUCTURAL MEMBER FOR LOAD-BEARING PARTITIONS OR WALLS OF BUILDINGS

Jules Albert Marchot, Avenue des Hauts Taillis, 5, B-1330 Rixensart, Belgium

Filed Sept. 4, 1975, Ser. No. 610,370
Claims priority, application Belgium, Sept. 11, 1974, 148435; Apr. 10, 1975, 155273; July 15, 1975, 158336
Int. Cl.² E04B *2/74*
U.S. Cl. 52—656 **10 Claims**



1. In a load-bearing partition or wall for a building or the like, a structural frame forming a skeleton and comprising two vertical uprights, two horizontal cross-members and a plurality of laterally spaced vertical struts connecting the frame cross-member, said uprights and cross-members being fabricated throughout from a single tubular metal section which is bent at each corner of the frame and which is butt-welded to itself at its ends, said struts being of the same type tubular metal section as that of the uprights and cross-members, with the ends of the struts being welded to said cross-members, the tubular metal section of the uprights, the cross-members and the struts having identical cross-section with said tubular section being of rectangular cross-sectional configuration with the longitudinal walls to the tubular section being reinforced by longitudinal depressions within the middle of the walls and extending towards the hollow tubular interior, and wherein the corners of said tubular section walls being rounded to impart high strength to said frame to effectively withstand bending stresses and compression stresses when subjected to building loads.

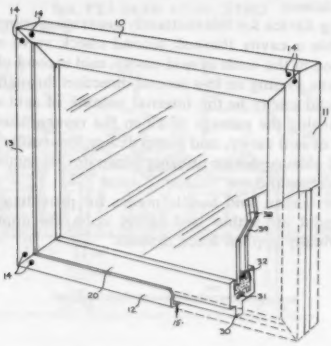
4,033,087
THERMAL GLASS STRUCTURAL METHOD AND DEVICE

Lyle N. Shelver, 5020 Ambrose Drive, Reno, Nev. 89502

Division of Ser. No. 460,277, April 12, 1974. This application June 9, 1975, Ser. No. 585,299
Int. Cl.² E04B *1/00*
U.S. Cl. 52—741 **3 Claims**

1. The method of converting a single pane window to a

double-walled thermal window, and where the single pane window frame, which holds the glass is basically of a U-shaped cross-section, including; (1) placing a sealant material within the members of an adaptive element suitable to hold two panes of glass at a spaced-apart relationship; (2) placing two



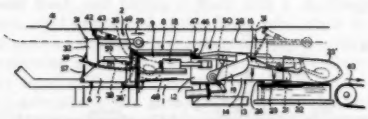
panes of glass at a spaced-apart relationship within said sealant and within said adaptive element; (3) placing dessicant material between said panes; (4) and mounting said adaptive element within the U-shaped portion of the single pane window frame.

4,033,088

METHOD OF AND APPARATUS FOR PACKAGING POULTRY SPECIMENS

Georg H. Markert, Bennekom, Netherlands, assignor to Maschinefabriek Markert B.V., Ede, Netherlands

Filed Nov. 11, 1975, Ser. No. 631,135
Int. Cl.² B65B *5/04, 25/00, 39/02*
U.S. Cl. 53—29 **5 Claims**

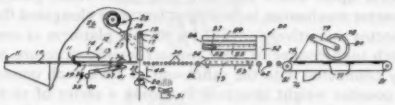


1. A method for packaging specimens of prepared poultry in bags, so that each specimen eventually will be positioned in a bag with the legs folded and lying against the bottom side of the body, whereafter the bag with contents is discharged for further treatment, comprising the steps of catching each specimen to be packaged at the legs by means of catching means advanced by a conveyor belt, through pushing means acting on the legs producing an upward pushing motion in the direction of the poultry body, then by a translation, through said upward pushing in the same direction moving the specimen across an articulated funnel provided with abutting means, stopping temporarily the specimen at the abutting means while the translative movement of the legs of the specimen continues, involving and folding the legs of the specimen firmly against the bottom side of the body of the specimen, after which there is withdrawing of the abutting means when the pressure exerted by the body of the specimen on the abutting means exceeds a certain value of the resisting force of the abutting means and pushing the specimen with folded legs to proceed further with the pushing means, said funnel having jaws movable relative to each other, inserting jaws in converged condition in a bag kept stationary by retaining means, thereafter moving the jaws outwardly relative to each other so that the poultry specimen can leave the funnel via the jaws and arrive in the bag enveloping the funnel, thereafter retracting the funnel and advancing the bag with the poultry specimen contained therein by the pushing means, and through coaction of the pushing means and the retaining means of the bag releasing at least the filled bag portion from the retaining means.

4,033,089

PACKAGE WRAPPING METHOD AND APPARATUS

Henry Lowell Byland, 160 Bent Grass Drive, Roswell, Ga. 30075

Filed July 21, 1976, Ser. No. 707,338
Int. Cl.² B65B *11/12*
U.S. Cl. 53—33 **12 Claims**

1. The method of automatically wrapping in a sheet of plastic film a tray filled with contents, comprising the sequential steps:

a. feeding said film between rollers driven in syncronization with tray travel and supporting said film at upper and lower edges thereof transversely to a path of advance of said tray;

b. preventing said film from wrinkling at its vertical edges and from prematurely catching upon said tray by directing a stream of air wider than said film onto said film from a side of advance of said tray;

c. advancing said tray horizontally into said film, and simultaneously releasing a bottom edge of said film to be drawn up and captured between a bottom of said tray and a support surface on which said tray is carried as the tray advances entirely past the initial position of said film;

d. lowering the top edge of said film down behind said tray to drape said contents of said tray with said film; and

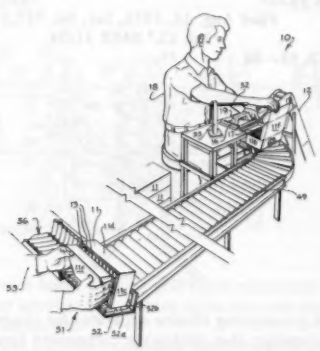
e. inserting a tucker and undersealer device between said surface and said tray, simultaneously folding said top edge of said film beneath said tray and joining said film to itself in a lap joint, thereby forming a pair of tubes to each side of said tray.

4,033,090

MACHINE FOR PACKAGING ROLLS OF COINS

Alvin R. Carlson, Pico Rivera, Calif., assignor to Bank of America National Trust & Savings Association, San Francisco, Calif.

Continuation of Ser. No. 576,592, May 12, 1975, abandoned. This application Sept. 22, 1976, Ser. No. 725,387
Int. Cl.² B65B *5/06, 35/50, 67/02*
U.S. Cl. 53—78 **7 Claims**



1. A machine for packaging a predetermined number of

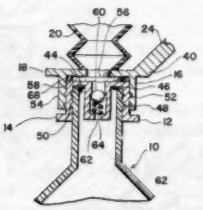
rolls of coins, in successive overlying rows upon each other, endwise in a box relative to an open top thereof, comprising; a loading station at which a machine operator is located; an elongated inclined table at said station; conveyor means for supplying rolls of coins onto said table in side-by-side contacting relationship thereon, the incline of said table causing said rolls of coins supplied thereto to move toward one end of said table under the effects of gravity; means at said station adjacent said table for movably supporting a box to be filled on its side in predetermined orientation with an open top thereof facing said table and with one side panel thereof initially generally aligned with the top of said table; said box supporting means comprising an incrementally downwardly movable platform upon which said box side panel rests, pulley and connector mechanism including at least one elongated flexible connector operatively engaged with said platform at one end of each such connector, and counter weight structure operatively connected with the other end of each such connector; said counter weight structure including a series of vertically spaced interfitted weight members the lowermost of which is engaged with said other end of its associated connector, each of said weight members corresponding generally in weight with the collective weight of a single row of rolls of coins to be inserted endwise into said box, support structure mounting said weight members independently of each other and in vertically spaced relationship for movement relative to each other so that successive weight members may be brought into contact with and move each other upwardly upon downward movement of said platform and said connector therewith; operator actuated pusher means movable transversely and sequentially across said table relative to said box in response to operator actuation to sequentially contact the ends of a predetermined number of rolls of coins and urge the same endwise into said box as discrete successive rows; said counter weight structure reacting in response to incremental movement of said platform downwardly in response to the combined weight of each successive row of rolls of coins inserted in sequence into said box in response to sequential actuation of said pusher means, so that each successive underlying weight member is moved upwardly into sequential contact with a successive overlying weight member, whereby the combined weight supported on said connector is progressively increased as successive rows of rolls of coins are inserted into said box, downward movement of said platform being positively halted in predetermined increments following insertion of each successive rows of rolls of coins into said box by each successive underlying weight member contacting its adjacent successive overlying weight member.

4,033,091

PRESSURIZING CLOSURE APPARATUS

Arthur Michael Saponara, 144-32 Barclay Ave., Flushing, N.Y. 11355

Filed Aug. 24, 1976, Ser. No. 717,114
Int. Cl.² B65B *31/04*
U.S. Cl. 53—88 **8 Claims**



1. A pressurizing closure apparatus for closing the opening in a container that contains a carbonated liquid or the like comprising in combination:

a closure device for removable engagement over said opening in said container, said closure device for sealing said opening;

first check valve means disposed in said closure device that passes air in a first direction through said closure device to the internal volume of said container and opposes the passage of said air in the reverse direction and out of said container;

a pump device for intermittantly generating compressed air within a cavity thereof, second check valve means disposed in the walls of said cavity, said second check valve means passing air in a second direction through said walls of said cavity to the internal volume of said cavity and opposing the passage of air in the reverse direction and out of said cavity, said pump device removably secured to said closure device utilizing pump device securing means therefor; and

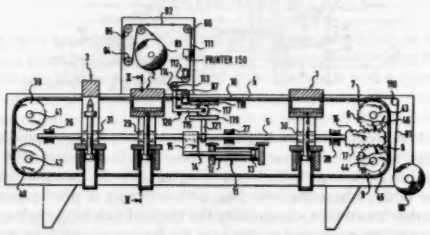
handle means, said handle means for providing said compressed air within said cavity upon the application of manually applied force thereto.

4,033,092

VACUUM PACKAGING MACHINE FOR THE PRODUCTION OF PACKAGES FROM PACKAGING MATERIAL WEBS

Arthur Vetter, Gronenbach, Germany, assignor to Multivac Sepp Haggenmueller KG, Wolfertschwenden, Germany

Filed July 25, 1975, Ser. No. 599,219
Claims priority, application Germany, Aug. 1, 1974, 7426251
Int. Cl.² B65B *31/04, 9/02*
U.S. Cl. 53—112 A **12 Claims**



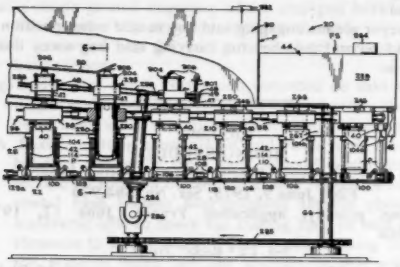
1. A vacuum packaging machine for the production of packages from first and second packing material webs, wherein said second web is wound on a storage roll, comprising at least one working station and one sealing station, including means reciprocating said stations through a work cycle, means for feeding said first web to said working station and thence to said sealing station in a continuous manner, means operatively connecting said station reciprocating means to said first web feeding means, means for intermittently reeling off said second web from said storage roll, comprising movable guide means for converting the intermittent movement of the reeled off second web into a movement of a continuous manner feeding into said sealing station for sealing the second web to said first web, whereby the discontinuous movement of said second web is transformed into a movement of a continuous manner, and means operatively connecting said movable guide means to said station reciprocating means for moving said second web downstream of said movable guide means in unison with said first web.

4,033,093

BOTTOM FILLING POUCH PACKAGING METHOD AND APPARATUS

Samuel A. Mencacci, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Jan. 19, 1976, Ser. No. 650,346
Int. Cl.² B65B 31/06, 31/02
U.S. Cl. 53—112 B 13 Claims



1. An apparatus for packaging a particulate product in a pouch having an open upper end and a closed lower end comprising: an endless pouch conveyor, pouch carrier means on said conveyor for supporting a pouch, an endless filling tube conveyor disposed above said pouch conveyor, filling tube carrier means on said filling tube conveyor, a filling tube slidably supported by said filling tube carrier and disposed in alignment with the pouch therebelow, said filling tube having an open upper end and an open lower end, means defining a normally closed gate near the lower end of the filling tube, means defining a cam track including a first inclined portion and a second inclined portion operatively connected to said filling tube, said first inclined portion effecting lowering of the filling tube into the pouch to a lowermost position with the lower end of the filling tube disposed immediately adjacent the lower end of the pouch, means defining a rotary filler bowl disposed between said first and said second inclined portions of said track and having a floor with a discharge opening therein, said upper end of the filling tube when in its lowermost position adapted to register with said discharge opening for receiving an amount of the particulate product from said filling bowl sufficient to completely fill the portion of the filling tube above said gate means, said second inclined portion of the track being effective to raise the filling tube out of the pouch, means for opening the gate means as the filling tube is being raised out of the pouch by the second inclined portion of said track to allow the product to transfer from the filling tube through the open gate means into the pouch, and means for thereafter sealing the upper end of the pouch.

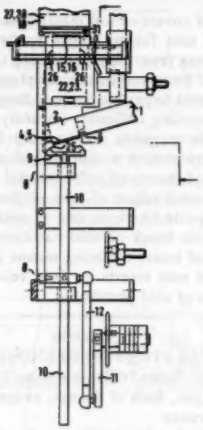
4,033,094

APPARATUS FOR ORIENTING AND FOR AUTOMATICALLY PILING UP BOBBINS OF YARN

Anton Schiffmann, Staad, Switzerland, assignor to Arova Rorschach AG, Switzerland

Filed June 22, 1976, Ser. No. 698,598
Claims priority, application Switzerland, June 24, 1975, 8219/75
Int. Cl.² B65B 5/10
U.S. Cl. 53—242 2 Claims

1. Apparatus for orienting and for automatically collecting bobbins of yarn wound on a winding device of a winding-up maching, comprising an inclined channel member arranged for bobbins of yarn of a predetermined size to slide therealong from the winding-up machine, said channel having a width smaller than the length of a bobbin of yarn of said predetermined size and larger than the outer diameter of said bobbin of yarn so that said bobbins of yarn slide along said channel member with a constant orientation relatively thereto, a positioning device for locating each bobbin of yarn after travelling along said channel member in a fixed position at the lower end of said inclined channel member, said positioning device being formed with an aperture and shaped to locate a bobbin of yarn received from said channel above said aperture, a container temporarily mounted above said positioning device and formed with an opening in its base through which bobbins of yarn may be introduced in sequence into said container, a lifting unit including a thrust member shaped and arranged to raise through said aperture to engage a bobbin of yarn thereabove and carry said bobbin of yarn through said opening and closure means for said opening comprising two flaps respectively mounted on two spring-loaded upwardly extending support member which in the closing position of said closure means locate said flaps edge to edge across said opening, said support members being pivotally mounted and located to be thrust away from one another, so as to separate said flaps, by a bobbin of yarn rising on said thrust member into said container, said thrust member and said support members being mutually formed so as to permit said two flaps to approach one another and close said container beneath said bobbin of yarn immediately after said bobbin of yarn has been raised by said thrust member substantially wholly above said flaps.

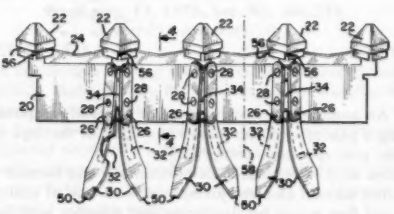


4,033,095

NECK-DOWN BOTTLE PACKING GRID

Anton J. Wild, 310 Springfield Ave., Westfield, N.J. 07092

Filed Sept. 8, 1976, Ser. No. 721,269
Int. Cl.² B65B 39/02
U.S. Cl. 53—248 14 Claims



1. A neck-down bottle packing grid which eliminates metal to glass contact between the packing apparatus and the glass bottles which comprises:

a. a plurality of partitions extending approximately parallel with respect to one another;

b. a plurality of guide block mounts positioned at approxi-

mately equal distances along the upper edges of said partitions;

c. a plurality of guide blocks of soft material mounted upon said guide block mounts;

d. a plurality of finger blocks secured to said partitions and extending downwardly from each of said guide blocks on opposite sides of said partitions, said finger blocks including two outwardly facing guide surfaces being tapered obliquely from said partition to which said finger block is secured to define in combination with said guiding surfaces of adjacent finger blocks a plurality of bottle receiving cells;

e. a plurality of covers of soft material secured to said guide surfaces of said finger blocks to be similarly tapered obliquely away from said partitions;

f. a plurality of fingers of soft material secured to said guide surfaces of said finger blocks, said fingers including lower sections extending obliquely inwardly toward the center of said cells to guide downwardly falling bottles into individual orientation within individual cells;

g. a plurality of inserts of soft material secured at the upwardly disposed edges of said partitions and extending from each guide block on one of said partitions to each adjacent guide block on said partition; and

h. a plurality of insert retaining means adjacent said partition to hold said inserts in fixed relationship along the upper edges of said partitions.

4,033,096

APPARATUS FOR OPENING BAGS

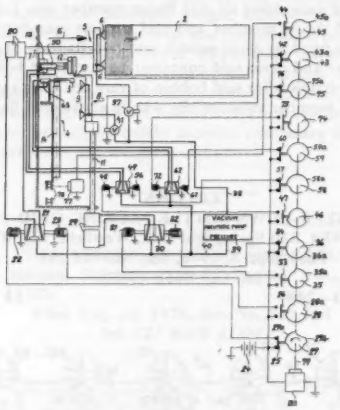
Georges Burgat, Saint-Didier-Au-Mont-D'Or, and Bernard Guillemaut, Lyon, both of France, assignors to Thimmonier S.A., Lyon, France

Filed May 11, 1976, Ser. No. 685,144

Claims priority, application France, May 12, 1975, 75.15559

Int. Cl.² B65B *43/30*

U.S. Cl. 53—386 **9 Claims**



9. An apparatus for opening a flat vertically disposed bag having a pair of opposite panels and open at the tops of said panels, said apparatus comprising:

a first member displaceable horizontally and formed with a first suction element juxtaposed with one of said panels and first means for displacing said member with forward movement and reverse movement whereby said first suction element is brought into engagement with said bag during said forward movement and entrains said bag during said reverse movement from a supply of such bags;

a second movable member and second means for displacing same vertically into a position between said first member and said supply, said second member having a suction element turned toward the suction element of the first member for engagement with said second panel upon a succeeding forward movement of said first member towards said second member, said first means displacing said first member thereafter away from said second member with said suction elements engaging said panels to spread said panels apart and open said bag, said second means displacing said second member vertically out of alignment with said first member into another position; and

conveyor means engaging said bag in said other position of said second member for carrying said bag away therefrom.

4,033,097

RIDING SADDLE

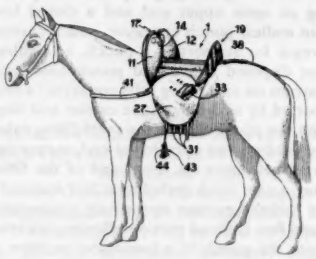
Michel Petit, 3, Avenue Branly, 78220 Viroflay, France

Filed June 9, 1975, Ser. No. 584,970

Claims priority, application France, June 12, 1974, 74.20366

Int. Cl.² B68C *1/00*

U.S. Cl. 54—44 **15 Claims**



1. A riding saddle structure comprising in combination: a seat for directly receiving the body of the rider, which seat consists essentially of two inflatable cushions disposed on each side of the median plane of the saddle structure; and a pommel which consists essentially of an upwardly projecting substantially flexible and substantially inflatable curved structure, a flexible interconnection of the curved structure and a front edge of the cushions, the front part of the saddle structure deriving a relative rigidity solely from the bending of said flexible interconnection to a downwardly concave configuration to the exclusion of a conventional bow, and means to attach the saddle to a horse.

4,033,098

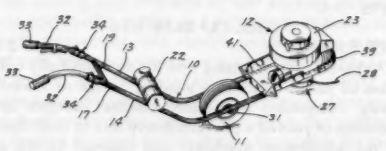
GRASS TRIMMING APPARATUS

Garry J. Green, Corydon, Iowa 50060

Filed May 30, 1975, Ser. No. 582,172

Int. Cl.² A01D *55/18*

U.S. Cl. 56—17.5 **4 Claims**



1. A grass trimming apparatus comprising

a. an elongated frame structure including a pair of transversely opposite longitudinally extended side members each of which includes a forward horizontal base section, and an upwardly and rearwardly inclined rear section

terminating in a downwardly and rearwardly inclined handle member,

b. a first transverse member connecting together the rear sections of said members,

c. a motor,

d. a motor support means comprising a pair of longitudinally spaced mounting plates secured to said forward horizontal base section and extending within the confines of said forward horizontal base section,

e. a single ground engaging wheel arranged between said base section adjacent the rear ends thereof,

f. a transverse axle for said ground wheel carried on said base section,

g. said motor and a cutter unit mounted on said support means said motor and cutter unit located within the transverse confines of said forward horizontal base section

h. flexible cutting elements on said cutter unit extendible laterally outwardly from said forward horizontal base section on rotation of said cutter unit, said forward horizontal base section longitudinally tiltable about said transverse axle to move the cutting zone of said cutting elements to a first position such position being closer to the material being cut and laterally tiltable with said ground engaging wheel to move the cutting zone of said cutting elements to a second position to one side of the frame structure,

i. a front bumper member having the ends thereof secured to the forward ends of said horizontal base section and projected forwardly thereof to form a protective guard for the lower forward side of said motor, and,

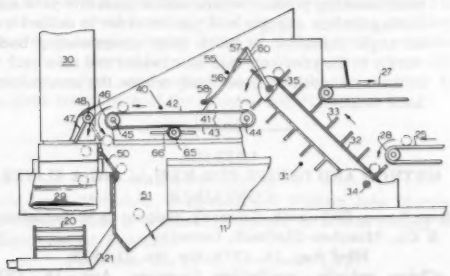
j. means for adjustably supporting at least one of said handle members on a rear section corresponding thereto for rotational movement relative to the longitudinal axis of said corresponding rear section to adjusted positions extended laterally from from either one or the other of the sides of said rear section.

4,033,099

TOMATO HARVESTING EMPLOYING ELECTRONIC SORTING

William C. Friedel, Jr., Rio Vista; Thomas S. Bettencourt, Isleton, and Daniel L. Freeman, Rio Vista, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Oct. 24, 1975, Ser. No. 625,542
Int. Cl.² A01D *46/00*
U.S. Cl. 56—327 R **14 Claims**



1. In a tomato harvester having pickup means for severing and picking up tomato plants from a field, elevating means for raising them to a desired height, separating means for detaching the tomatoes from the plants and separating them therefrom, tomato conveyor means for conveying the detached and separated tomatoes, and cross-conveyor means for receiving selected tomatoes after sorting, the combination of:

electronic sorting means positioned between said tomato conveyor means and said cross-conveyor means and comprising rejector means for rejecting culls and impelling them away from a normal trajectory,

a rejection chute into which said rejector means impels the rejected culls, said chute dropping the rejected culls on the ground, while the selected tomatoes, being non-rejected fruit, fall by said normal trajectory to said cross-conveyor means, and

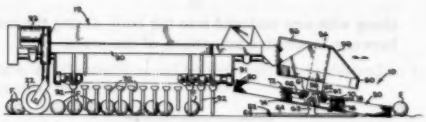
preparatory means in between said tomato conveyor means and said electronic sorting means for impelling tomatoes at said normal trajectory toward said electronic sorting means.

4,033,100

WINDROWING MACHINE WITH ROTARY BRUSH AND DEPTH CONTROL UNIT

Leon R. McRobert, Ocoee, Fla., assignor to FMC Corporation, San Jose, Calif.

Division of Ser. No. 463,328, April 23, 1974, Pat. No. 3,914,925. This application Apr. 17, 1975, Ser. No. 568,882
The portion of the term of this patent subsequent to Oct. 28, 1992, has been disclaimed.
Int. Cl.² A01D *51/00*
U.S. Cl. 56—328 R **3 Claims**



1. In a windrowing machine for windrowing articles lying on the ground, which machine includes a mobile vehicle movable along a relatively soft article supporting surface, mechanism comprising; a generally horizontal frame pivotally connected to said vehicle and projecting outwardly from one side thereof and forwardly with respect to the direction of motion of the vehicle, means connected along the length of said frame for sweeping articles along said article supporting surface, a driven upstanding shaft journaled on said frame at the other end thereof, a flat circular frame supporting disc, and universal joint means connecting said disc to said shaft for rotation therewith and for universal movement relative thereto with the flat surface of the disc riding on said soft supporting surface.

4,033,101

CONTINUOUS LOAD STACK-FORMING METHOD AND MACHINE

David Paul Fritz, Newton; John Dale Anderson, Canton; Martin Eugene Pruitt; Deroy Ernest Mahagan, both of Hesston, and Richard James Buller, Newton, all of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Aug. 13, 1975, Ser. No. 604,310
Int. Cl.² A01D *87/10*
U.S. Cl. 56—344 **17 Claims**

1. A continuous loading stack-forming machine including:

a mobile, hollow body for receiving crop material to be formed into a stack,

said body including a press for periodically compacting material received within the body;

a loader adjacent said body for continuously lifting material from a field as the body is advanced and for delivering the material into the body;

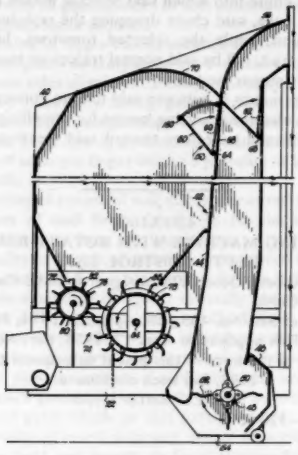
an accumulating chamber ajacent said loader;

a diverter selectively operable to direct picked up material into the chamber instead of the body;

structure selectively operable to retain the diverted material in the accumulator or discharge the same for recirculation through said loader; and

mechanism controlling operation of said diverter and said

structure for accumulating material in said chamber during actuation of the press and loading the accumulation



along with new material into the body during the interval between successive actuations of the press.

4,033,102

METHOD AND APPARATUS FOR TWISTING CORE STRANDS

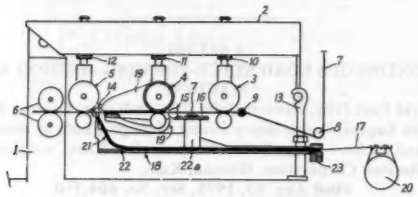
Michel E. Vanhelle, Wattrelos, France, assignor to Centre Technique Industriel dit: Institut Textile de France, Boulogne-sur-Seine and Etablissement Public dit: Agence Nationale de Valorisation, Neuilly-sur-Seine, both of, France

Filed Mar. 22, 1976, Ser. No. 668,987

Claims priority, application France, Mar. 21, 1975, 75.08951

Int. Cl.² D02G *3/36*

U.S. Cl. 57—12 **9 Claims**



5. Apparatus for producing a core strand of the type comprising a sheath of fibers surrounding a central strand, said apparatus comprising a double sleeve drawing unit having downstream drawing cylinders for the drawing of at least one sliver of fibers; a feeding device having at least one feed tube for feeding under constant tension, at least one central strand through said tube and introducing said central strand into a sliver of fibers upstream of said downstream drawing cylinders; and a self-twisting unit located downstream of said drawing unit and having self-twisting cylinders for conferring a torsion successively in one sense and the other on said slivers of fibers, at least one of them having a central strand inserted therein, whereby a self-twisted core strand is obtained downstream of said self-twisting cylinders by the natural untwisting in one sense and in the other of said slivers of fibers.

4,033,103

PROCESS AND APPARATUS FOR PRODUCING A VARIABLE DIAMETER ALTERNATE TWIST YARN

Tatjana Vukoje, Dusseldorf, Germany, assignor to Akzona Incorporated, Asheville, N.C.

Filed Mar. 6, 1975, Ser. No. 555,900

Claims priority, application Germany, Mar. 8, 1974, 2411074

Int. Cl.² D02G *1/02, 3/34*

U.S. Cl. 57—34 HS **14 Claims**

1. In a process for the production of an effect yarn having thick and thin portions by a false twist texturizing under variable tension of a thread bundle consisting essentially of continuous synthetic thermoplastic filaments, the thread bundle being conducted in a normally linear path between a heating zone and a false twister for said texturizing, the improvement which comprises:

intermittently deflecting the thread bundle from its normally linear path and shortly before entry into said false twister by means of a twist blocking element placed in running contact with said thread bundle.

7. In a false twist texturizing apparatus including a false twister, a heater arranged at an interval before said false twister and forming therewith a false twist texturizing zone, and means to conduct a multifilament thermoplastic yarn through said false twist texturizing zone, the improvement for producing a thick-thin yarn with said apparatus which comprises:

a twist blocking means arranged in said false twist texturizing zone between said false twister and said heater, said twist blocking means having at least one yarn contacting surface which is reciprocally movable from a neutral position substantially free of contact with said yarn into a twist blocking position where said at least one yarn contacting surface engages said yarn in order to deflect it at an angle sufficient to block twist accumulating backwardly in the yarn from said false twister and then back to said neutral position to suddenly release the accumulated back twist.

4,033,104

METHOD AND DEVICE FOR REPLACING A SLIVER CONTAINER

Heinz Kamp, Rickelrath, Germany, assignor to W. Schlafhorst & Co., Monchen-Gladbach, Germany

Filed Aug. 16, 1976, Ser. No. 714,979

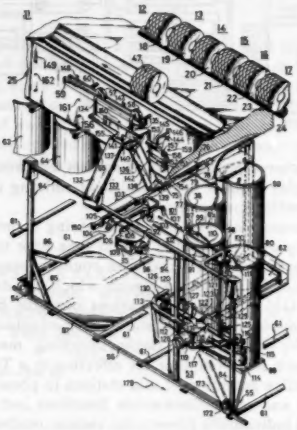
Claims priority, application Germany, Aug. 16, 1975, 2536435

Int. Cl.² D01H *9/00*

U.S. Cl. 57—34 R **7 Claims**

1. Method of replacing a sliver container in a spinning machine formed of a plurality of individual spinning stations, sliver containers being disposed in tandem in two rows, by means of a transporting device carrying a limited supply of the containers and being constrained to travel on a given travel path along the spinning machine, which comprises disposing at the spinning machine a respective pair of sliver containers

in tandem on a carriage or slide movable transversely to the given travel path of the transporting device, loading the transporting device with filled sliver containers at one end of the spinning machine and unloading the transporting device of exchanged sliver containers at the same one end of the spinning machine or at the other end thereof, shuttling the transporting device back and forth, ready for operation, past the spinning stations of the spinning machine after the transporting device has been loaded with filled sliver containers, stopping the transporting device in front of a sliver container of a respective spinning station in response to a signal from the respective spinning station that sliver is missing from the respective sliver container and performing the following operations: drawing the carriage or slide up from a working station thereof to the level of the supply of containers on the transporting device, selecting the container with missing sliver that



is to be replaced, replacing the container with missing sliver by a container filled with sliver, feeding a starting end of the sliver from the container filled with sliver to a sliver guide of the respective spinning station, returning the carriage or slide to the working station thereof, and resuming travel of the transporting device along the given travel path thereof.

2. Device for carrying out a method of replacing a sliver container in a spinning machine formed of a plurality of individual spinning stations, sliver containers being disposed in tandem in two rows, by means of a transporting device carrying a limited supply of the containers and being constrained to travel on a given travel path along the spinning machine, comprising carrying means disposed at the spinning machine for receiving thereof respective pairs of sliver containers disposed in tandem, said means being movable transversely to the given travel path of the transporting device.

4,033,105

YARN PROCESSING

David Leslie McNeight, Congleton, and William John Morris, Didsbury, both of England, assignors to Ernest Scragg & Sons Limited, England

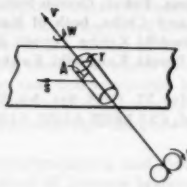
Filed Feb. 26, 1973, Ser. No. 335,727

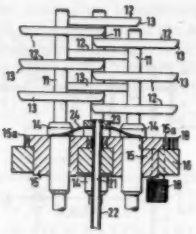
Claims priority, application United Kingdom, Mar. 6, 1972, 10328/72

Int. Cl.² D02G *1/04*; D01H *7/92*

U.S. Cl. 57—77.4 **16 Claims**

9. Apparatus for friction false twisting yarn, comprising at least three sets of equally spaced parallel friction wheels with rounded edges, the sets being rotatable about respective common axes which are parallel and equally spaced and are distributed about a yarn path so that adjacent wheels of each set have between them a single wheel of each other set, the spacing of the axes and the axial disposition of the wheels being chosen to provide that the yarn path is so controlled that the angle of travel of the yarn over the rounded edges of the





wheels is substantially equal to the twist angle desired to be imparted to the yarn.

4,033,106

FRICTION DISC FOR DRIVING TWIST TUBES ROTATING AT HIGH SPEEDS

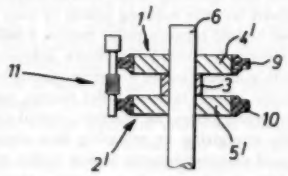
Josef Raschle, Butschwil, Switzerland, assignor to Heberlein & Co. Ag, Switzerland

Filed Oct. 28, 1975, Ser. No. 626,543

Claims priority, application Switzerland, Dec. 4, 1974, 16069/74

Int. Cl.³ D01H *1/243*

U.S. Cl. 57—77.45 **5 Claims**



1. A friction disc for using in a driving assembly for a twist tube in a false twist device for texturing synthetic filaments, wherein the twist tube is driven at high speed in contact with the edge of the friction disc, the friction disc comprising a support disc symmetrical about a central axis and having a peripheral surface of uniform axial width, said support disc comprising at least one non-resilient material and being formed for axial mounting on means for rotating the friction disc about said axis, and a friction ring of resilient synthetic material having an inner circumferential surface fixed to and substantially covering said peripheral surface of said support disc, and having an outer circumferential driving surface of less axial width than said peripheral surface and providing the edge for contact with the twist tube, said friction ring being tapered on all radii about said axis from said inner circumferential surface to said outer circumferential surface and said friction ring being symmetrical with respect to a median plane of the disc extending parallel to the plane of the disc.

4,033,107

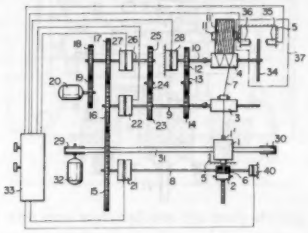
METHOD AND APPARATUS FOR CONTROLLING DRIVING OPERATION OF OPEN-END SPINNING FRAME

Chikanobu Sasayama, Fukui; Osamu Suzuki, Oobu; Takeshi Shimizu, and Kunji Chiba, both of Kariya, all of Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho and Daiwa Boseki Kabushiki Kaisha, Osaka, both of, Japan

Filed May 22, 1975, Ser. No. 580,058

Int. Cl.² B65H *63/08, 61/00*

U.S. Cl. 57—81 **8 Claims**



1. In an apparatus for controlling the driving operation of an open-end spinning frame provided with a plurality of spinning units, a common driving motor for driving all the spinning units and driving gear trains for transmitting driving power from said common driving motor to each spinning unit, each spinning unit comprising a spinning rotor, a roller means for supplying fibers into said spinning rotor, a take-up roller means for delivering a yarn from said spinning rotor and a winding roller for forming a yarn package from said yarn delivered from said take-up roller means, an improved apparatus comprising, means for measuring the length of the yarn delivered from said spinning rotor, electromagnetic clutches which selectively transfer rotating power or stop transferring rotating power to said take-up roller means, winding roller or said roller means, for supplying fibers independently and selectively with said gear trains, electromagnetic brakes which stop the rotation of said take-up roller means, winding roller means for supplying fibers, an electric control circuit means for selectively energizing or releasing said electromagnetic clutches or said electromagnetic brakes under control of an output signal from said means for measuring the length of the yarn delivered from the spinning rotor in accordance with a predetermined program, said electric control circuit comprising means operative in response to the start of the driving operation of said spinning units for supplying reverse driving signals to both said take-up roller means and said winding roller, for supplying following a predetermined time after the start of the driving operation, forward driving signals to said roller means for supplying fibers and, following a predetermined time after the roller means for supplying fibers is energized, for supplying a stop motion followed by a forward motion signal to both said take-up roller means and said winding roller said electric control circuit means further comprising means operative in response to stopping the driving operation of said spinning units, for supplying a braking signal to said roller means for supplying fibers and, following a predetermined time after supplying said braking signal to said roller means for supplying fibers, for supplying braking signals to both said take-up roller means and said winding roller.

4,033,108

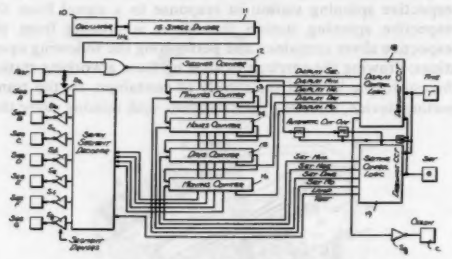
AUTOMATIC CUT-OFF SETTING SYSTEM FOR LED DISPLAY IN A SOLID-STATE WATCH

William O. Bennett, Bayside, and Robert F. Sagarino, Wheatley Heights, both of N.Y., assignors to Bulova Watch Company, Inc., New York, N.Y.

Filed Mar. 2, 1976, Ser. No. 663,139

Int. Cl.² G04B *19/30*; G04C *3/00*

U.S. Cl. 58—50 R **7 Claims**



1. In a battery-operated multi-function electronic watch having a display formed by several light-emitting diode stations, the combination comprising:

A. a miniature electonic computer having a time base, a frequency divider coupled to said time base to produce low-frequency timing pulses and counters responsive to said pulses for producing signals which are decoded to actuate said stations, said stations normally being in a Normal-mode in which all stations are unactuated;

B. manually-operated releasable switching means associated with said computer for effecting in a Time-mode the selective actuation of said stations to present Hours-Minutes and other Time-mode functions and in a Set-mode to individually present the various readings constituting said functions, said switching means being constituted by a Time-mode button which when pressed and released in a particular manner produces said Time-mode functions, and a Set-mode button which when repeatedly pressed and released in a particular manner sequentially produces said readings to be set, said readings being thereafter updated by operation of said Time-mode button; and

C. automatic cut-off means associated with said switching means and acting both in the Time-mode and in the Set-mode to cause said display to revert to said normal-mode when said switching means are released or shortly thereafter.

4,033,109

TIME CORRECTION CIRCUITS FOR ELECTRONIC TIMEPIECES

Tsuneo Takase, and Tetsuo Yamaguchi, both of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Nov. 20, 1975, Ser. No. 633,834

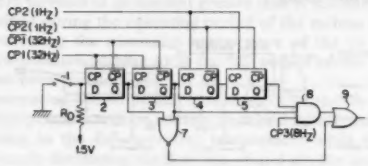
Claims priority, application Japan, Nov. 21, 1974, 49-133131; Nov. 21, 1974, 49-133133; Jan. 31, 1975, 50-12374

Int. Cl.² G04C *3/00*

U.S. Cl. 58—85.5 **10 Claims**

1. A time correction circuit for an electronic timepiece comprising a switch; a first shift register circuit including a plurality of cascade connected shift registers which are driven by a clock pulse having a first predetermined frequency for shifting an electric signal produced in response to the operation of said switch; a second shift register circuit including a plurality of cascade connected shift registers which are driven by a clock pulse having a second predetermined frequency lower than said first predetermined frequency for shifting the

output signal from said first shift register circuit; a first logical circuit connected to receive the output signals from the shift registers of the first and last stages of said first shift register circuit for producing a pulse corresponding to the electric signal supplied to said first shift register circuit by said switch; and a second logical circuit connected to receive at least the

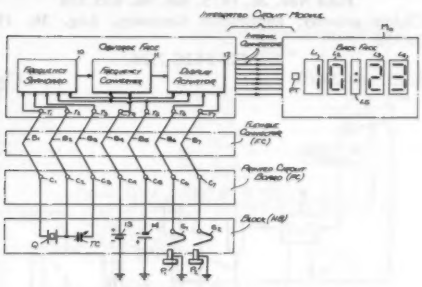


output signals from said first and second shift register circuits and a clock pulse having a third predetermined frequency for producing clock pulses having said third predetermined frequency and whose number corresponds to the interval in which said switch is maintained open or closed when said switch is maintained open or closed for an interval longer than a predetermined interval.

4,033,110
SOLID-STATE ELECTRONIC WATCH ASSEMBLY

Robert F. Sagarino, Wheatley Heights, N.Y., assignor to Bulova Watch Company, Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,135
Int. Cl.² G04B *37/00*
U.S. Cl. 58—88 R **6 Claims**



1. In a solid state electronic watch assembly provided with a watch case having a window at one end thereof; a movement insertable in said case, said movement comprising:

A. a module constituted by a dielectric plate on whose obverse face is mounted the electro-optical stations of a time display, each station being formed by a pattern of display elements which are selectively activatable to define different digits, the back face of said plate having integratedcircuit chips mounted thereon to provide the circuits of an electronic timekeeping system which is operable in conjunction with discrete elements and is energized by at least one replaceable power cell, the integrated circuits on the back face being connected by leads passing internally through said plate to said display elements on the obverse face to afford a time display, said back face having a row of module termnals thereon which are connected to said integrated circuits;

B. a generally rectangular housing block having wells formed in its forward section to receive said discrete elements and at least one hatch formed in its rear section to receive said cell, said block having a ledge on its forward end on which said module is seatable with its obverse face viewable through said window to expose said time display;

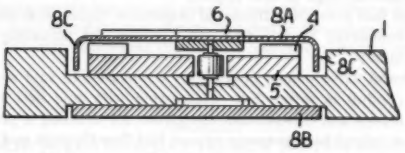
C. a rigid printed circuit board overlying the forward section of the block, the discrete elements which are receivable in said wells being supported from the underside of the board, said board having at least one connecting finger extending therefrom which overlies the rear section to engage said cell receivable in said hatch, said discrete elements and said finger being connected by said printed circuit to a corresponding row of board terminals; and

D. a flexible connector joining said module to said board and having a array of contacts bridging the module and board terminal rows, the module and the board joined thereto by the connector constituting a unitary subassembly which when placed over the housing block with the module seated on the ledge, with the discrete elements received in the wells, and with the finger engaging the cell received in the hatch thereby completes the movement.

4,033,111
ELECTRONIC WATCH HAVING ANTIMAGNETIC CHARACTERISTIC

Eiichi Matsuura, Chiba, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed Dec. 19, 1975, Ser. No. 642,336
Claims priority, application Japan, Dec. 23, 1974, 502640[U]
Int. Cl.² G04B *43/00*
U.S. Cl. 58—106.5 **3 Claims**



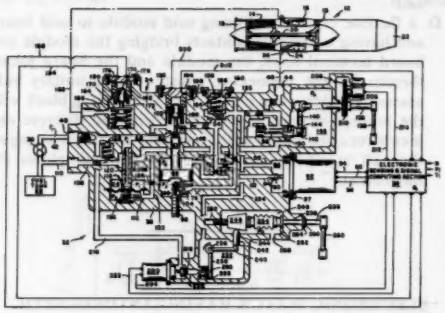
1. In an electronic watch of the type having a watch movement including a base plate having a pair of opposed major surfaces, an electromechanical transducer mounted on a first of said major surfaces and including a rotor operable to rotate by energization of said transducer, means defining a bridge structure a distance above said first major surface wherein a portion of said bridge structure comprises mounting means mounting said rotor for rotation, the improvement which comprises: shielding means defining magnetic shields above and below said transducer for shielding the same from magnetic fields external to the watch; said shielding means comprising a first plate-like portion of antimagnetic material carried by said bridge structure at substantially the same distance from said base plate as said bridge structure and overlying a portion of said electro-mechanical transducer, and a second plate-like portion of antimagnetic material disposed at the second major surface of said base plate and underlying a portion of said transducer, said second major surface having a sufficiently deep recess therein for receiving said second plate-like portion of said shielding means so that said second plate-like portion does not extend above said second major surface, said first and said second plate-like portions respectively overlying and underlying said electro-mechanical transducer sufficiently to effectively shield said transducer from magnetic fields external to the watch, and said first and second plate-like portions being spaced a distance not exceeding a distance between said bridge structure and said second major surface whereby said shielding means does not contribute to a thickness of the watch movement.

4,033,112

FUEL CONTROL FOR GAS TURBINE ENGINE

Robert W. Schuster, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Sept. 25, 1975, Ser. No. 616,731
Int. Cl.² F02C 9/08
U.S. Cl. 60—39.28 R 12 Claims



1. Fuel control apparatus for a combustion engine comprising:

a fuel supply conduit for conducting a flow of pressurized fuel from a pressurized source to said engine;

first positionable valve means operatively connected to said supply conduit for establishing a controlled flow of fuel therethrough to said engine;

first fuel pressure differential responsive means operatively connected to said first valve means for actuating the same;

second valve means operatively connected to said supply conduit in series flow relationship with said first valve means and downstream therefrom for creating a predetermined back pressure against fuel flow through said first valve means and restricting fuel flow to establish a predetermined fuel pressure differential in said supply conduit;

resilient means operatively connected to said second valve means for urging the same to a closed position in opposition to the fuel pressure upstream therefrom;

second fuel pressure differential responsive means vented to said supply conduit upstream and downstream from said second valve means and responsive to the fuel pressure differential therebetween for actuating said second valve means in an opening direction in opposition to said resilient means;

first passage means connected to said supply conduit in parallel flow relationship with said second valve means;

second passage means connecting said first fuel pressure differential responsive means to said supply conduit downstream from said second valve means;

a restriction in said first passage means;

a variable area valve in said first passage means for controlling the fuel pressure intermediate said restriction and said variable area valve; and

control means responsive to a plurality of variable conditions of engine operation operatively connected to said variable area valve for actuating the same;

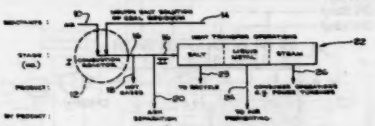
said first fuel pressure differential responsive means being verted to said first passage means intermediate said restriction and said variable area valve and responsive to the fuel pressure differential between said intermediate fuel pressure and said fuel pressure in said second passage means.

4,033,113

STEAM GENERATION WITH COAL

Frank B. Cramer, Mission Hills, Calif., assignor to Clean Energy Corporation, Burbank, Calif.

Division of Ser. No. 512,540, Oct. 7, 1974, Pat. No. 3,933,128.
This application Oct. 3, 1975, Ser. No. 619,387
Int. Cl.² F02C 3/20
U.S. Cl. 60—39.02 54 Claims



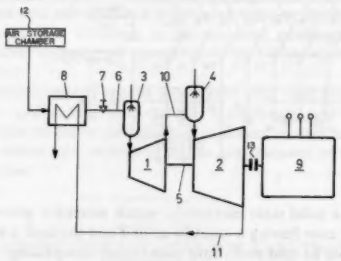
1. In the process for the generation and recovery of heat from highly aromatic, refractory carbonaceous fuel reactants which includes oxidizing the fuel in a molten salt matrix within a reaction zone and recovering heat of combustion from the salt matrix, dissolving the fuel in the salt to form a salt-fuel reactant solution, passing an oxidizing gas through said reactant solution to effect said oxidation, exhausting hot combustion gases from said solution, expanding and cooling said combustion gases through an expansion motor, and compressing said oxidizing gas with the energy of said expansion in advance of passing the same through said reactant solution.

4,033,114

METHOD FOR STARTING A GAS TURBINE PLANT WITH AN AIR ACCUMULATOR

Paul Zaugg, Baden, Switzerland, assignor to BBC Brown Boveri & Company Limited, Baden, Switzerland

Filed Nov. 26, 1975, Ser. No. 635,350
Claims priority, application Germany, Aug. 30, 1975, 2538756
Int. Cl.² F02C 7/26
U.S. Cl. 60—39.02 2 Claims



1. In the method for starting-up a gas turbine system by means of compressed air delivered from an air-storage chamber, and wherein said turbine system is comprised of a high-pressure turbine and a low-pressure turbine operating on a common shaft, a high-pressure combustion chamber preceding said high-pressure turbine, a low-pressure combustion chamber preceding said low-pressure turbine in the air flow path, and a connection from said air-storage chamber to said high-pressure combustion chamber, and wherein a rotary load such as an electrical generator is connectible to said turbine shaft through coupling means, the improvement characterized by the following steps:

a. feeding compressed air from said storage chamber through said turbine system to accelerate the same to normal operating speed,

b. igniting said high-pressure combustion chamber during the acceleration of said turbine system and controlling fuel flow thereto such as to maintain the air admission

temperature to said high-pressure turbine at a minimum value,

c. coupling the rotary load to said turbine shaft,

d. igniting said low-pressure combustion chamber,

e. increasing the pressure at the high-pressure combustion chamber up to the full operating pressure thereby raising the quantity of air flow through said high- and low-pressure turbines to an amount greater than is normally maintained during the operating period of the turbine system,

f. increasing the admission temperature of the air at said low-pressure turbine until the full output of the turbine has been reached, and

g. increasing the admission temperature of the air at said high-pressure turbine linearly from said initially minimum value to the full operating temperature while simultaneously decreasing the flow rate of said air, the increasing increase in admission temperature of the air at said low-pressure turbine being made simultaneously with the increase in admission temperature of the air at said high-pressure turbine whereby the output of the turbine system will remain constant and the rate of air flow through the turbine system is reduced to its normal value.

4,033,115

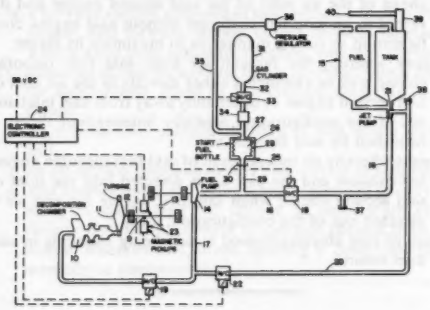
EMERGENCY HYDRAULIC POWER SYSTEM (START BOTTLE)

Stephen S. Baits, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed June 2, 1976, Ser. No. 692,083

Int. Cl.² F02C *7/26*; F02G *3/00*

U.S. Cl. 60—39.09 R **12 Claims**



8. In an emergency hydraulic power system operable upon aircraft engine failure, said emergency system being of the type which includes a decomposition chamber, a power unit driven by gaseous decomposition products from the chamber, a monofuel tank, a pump driven by the power unit and having an inlet and an outlet, inlet conduit means connecting the tank to the pump inlet, an outlet conduit connecting the pump outlet to the decomposition chamber, and a system controller, the improvement comprising, in combination:

a start bottle which includes a cell containing monofuel, said cell having a movable wall;

conduit means connecting said cell with said outlet conduit;

a gas pressure source;

means including an openable valve to deliver gas from said source to the cell movable wall to apply pressure to the monofuel therein;

and means associated with said conduit means for normally blocking flow from said cell to said outlet conduit but openable upon starting of the system to permit flow of monofuel under pressure past the fuel pump, into the outlet conduit and to said decomposition chamber.

4,033,116

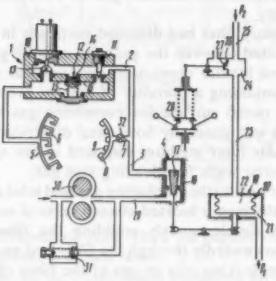
FUEL DISTRIBUTION ARRANGEMENT

Vasily Petrovich Dmitriev, ulitsa Kalinina 10, kv. 20; Anatoly Mikhailovich Polyakov, ulitsa Gorkogo, 35, kv. 6; Alexandr Grigorievich Tomilin, ulitsa Kalinina 28, kv. 22, and Stanislav Mikhailovich Shushpan, ulitsa Pushkina 27/28, kv. 8, all of Stupino Moskovskoi oblasti, U.S.S.R.

Filed Sept. 23, 1975, Ser. No. 616,067

Int. Cl.² F02C *9/08*

U.S. Cl. 60—39.28 R **5 Claims**



1. Apparatus for distributing fuel between a main manifold and a pilot manifold of a gas-turbine engine via passages connecting said manifolds and a fuel delivery line with a metering element, said apparatus comprising: a jet and two valves installed in parallel in the passage connecting the fuel delivery line and the main manifold, the first of said two valves comprising a stationary sleeve, a plunger in said stationary sleeve for controlling flow of fuel to said main manifold and means applying spring-bias to said plunger at the fuel delivery side to said main manifold, and means coupled to the second of said two valves for operating the same in response to engine speed.

4,033,117

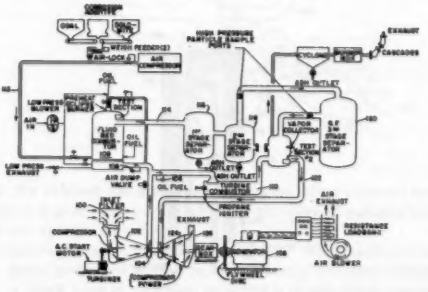
SOLID FUEL FIRED GAS TURBINE SYSTEM HAVING CONTINUOUSLY REGENERATING GRANULAR FILTER

Richard Dunham Smith, Palo Alto, Calif., assignor to The United States of America as represented by the Administrator, Environmental Protection Agency, Washington, D.C.

Filed Jan. 8, 1976, Ser. No. 647,540

Int. Cl.² F02C *3/20*; F02G *3/00*

U.S. Cl. 60—39.46 S **3 Claims**



1. A solid fuel fired gas turbine system for generating electric power comprising:

a. a generator for producing electric power;

b. a gas turbine for operating said generator;

c. a combustion chamber for burning solid fuel to form gas at high temperature and pressure for operating said turbine;

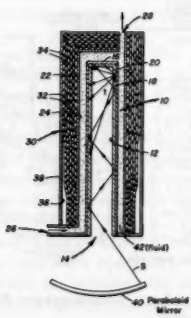
d. particle separation stages located between said combustion chamber and said gas turbine;
e. at least one of said stages including a continuously regenerating granular filter adapted to operate at the high temperature and pressure of said gas in order to clean said gas of particulate matter without significant loss of gas pressure or temperature;
f. said granular filter further comprising a filter chamber adapted to operate at a positive pressure;
g. a gas inlet and a gas outlet disposed in the wall of said chamber to enable gas to be cleaned to be admitted into the chamber and cleaned gas to be emitted from said chamber;
h. a stationary filter bed disposed vertically in said chamber and located between the gas inlet and the gas outlet, said filter bed further comprising two vertical annular walls, each containing a plurality of louvers providing an inlet and an outlet surface for permitting gas to flow therethrough in a generally horizontal direction;
i. a granular filter medium disposed in the space between the annular walls for cleaning said gas;
j. the filter bed further including gas seal inlet means and gas seal outlet means located at each vertical end of said filter bed for simultaneously enabling the filter medium to move downwardly through the filter bed and preventing a gas from leaking into or out of the filter chamber;
k. filter medium cleaning means for cleaning the filter medium disposed external to said filter chamber;
l. filter medium circulating means associated with said gas seal outlet means and adapted to circulate the filter medium from said outlet means, through the cleaning means, to the gas seal inlet means, and downwardly through the filter bed, whereby the filter bed is continuously being provided with a clean supply of filter medium; and
m. pressurized gas cleaning means in the filter chamber disposed apart from and facing the inlet surface of the filter bed annular wall for periodically directing a gas under pressure downwardly at an angle against said inlet surface for cleaning deposits from said surface of the filter bed closest to the gas inlet, whereby said deposits are loosened from said inlet surface and fall downward where they are removed from the filter chamber through said gas seal outlet means.

4,033,118

MASS FLOW SOLAR ENERGY RECEIVER

William R. Powell, 10403 May Wind Court, Columbia, Md. 21044

Filed Aug. 19, 1974, Ser. No. 498,529
Int. Cl.² F03G 7/02; F24J 3/02
U.S. Cl. 60—641 **18 Claims**



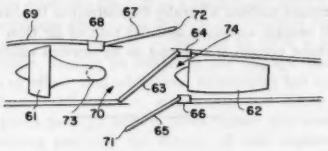
13. Apparatus for facilitating energy flow, comprising:
body means having walls which define a cavity and an entrance opening to the cavity, the walls being formed of material relatively near the entrance opening which is a good absorber of infrared radiation relative to the material of which the walls are formed at portions of the body means relatively further away from the entrance opening;
a flowable mass of material; and,
means for directing a flow of said mass along the walls of the body means to cool certan portions of said body means relative to other portions thereof.

4,033,119

DUAL CYCLE AIRCRAFT TURBINE ENGINE

Mark R. Nichols, Newport News, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sept. 6, 1973, Ser. No. 394,898
Int. Cl.² F02K 3/06
U.S. Cl. 60—226 R **6 Claims**



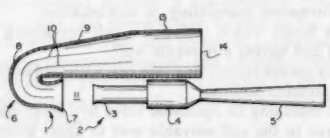
1. An aircraft multi-engine configuration which is comprised of:
a first turbofan engine followed in tandem by a second turbine engine;
duct means connecting the discharge of the first turbofan engine with the inlet of the second turbine engine;
means whereby the hot exhaust flow from the said first turbofan engine is removed from an internal airstream ahead of the air inlet of the said second engine and diverted to an external airstream without said engine configuration in such a manner as to maximize its thrust;
means whereby the fan-exit air from said first turbofan engine may be channeled either directly to the air inlet of said second engine or alternately away from said inlet and out of the configuration whereby independent thrust is furnished by said fan-exit air;
means whereby air independent of said first turbofan engine hot-exhaust and fan-exit air is directed into the inlet of said second engine when said first engine fan-exit air is directed out of the configuration; and
each of said aforementioned means being elements in said duct means.

4,033,120

THRUST AUGMENTING FLUID RECTIFIER FOR A PULSED COMBUSTOR

John A. C. Kentfield, Calgary, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Aug. 21, 1975, Ser. No. 606,525
Int. Cl.² F02K 7/02
U.S. Cl. 60—249 **9 Claims**



1. A thrust augmenting fluid rectifier for a valveless pulsed combustor having an inlet duct, a combustion chamber, and an outlet duct, comprising ducting having a converging inlet section, a flow redirecting section, a diverging section and an

outlet, the converging inlet section of the ducting having an inlet cross-sectional area larger than that of the combustor inlet duct, said converging inlet section being spaced upstream from the combustor inlet duct to define an air intake region and being operative to receive backflow from the combustor and secondary air from the intake region, said flow redirecting section being adapted to redirect fluid flowing through the ducting through substantially 180°.

4,033,121

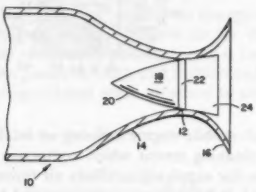
NOISE CONTROLLABLE NOZZLE CLOSURE

Robert E. Betts, Huntsville; Lawrence B. Thorn, Madison, and Albert R. Maykut, Huntsville, all of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Division of Ser. No. 484,035, June 28, 1974, Pat. No. 3,968,646. This application Dec. 22, 1975, Ser. No. 643,411

Int. Cl.² F02K *1/00, 1/26*

U.S. Cl. 60—271 **7 Claims**



1. In a rocket motor having a nozzle including an entrance section, a throat section, and an exit section, closure means for controlling the opening of said nozzle responsive to ignition of said rocket motor comprising:

a. a forward section disposed in said entrance section of said nozzle, said forward section having surfaces tapered inwardly away from said throat section, whereby the largest diameter of said forward section is provided with a diameter substantially equal to the internal diameter of said throat;

b. an intermediate section disposed in said throat section; and,

c. an aft section disposed in said exit section of said nozzle,

d. said closure member having a predetermined density and mass for controlling the change of momentum of the closure member responsive to ejection thereof from said nozzle, whereby said nozzle opening is controlled incrementally or continuously.

4,033,122

METHOD OF AND SYSTEM FOR CONTROLLING AIR FUEL RATIOS OF MIXTURES INTO AN INTERNAL COMBUSTION ENGINE

Kenji Masaki, and Hidehiro Minami, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 18, 1974, Ser. No. 516,077

Claims priority, application Japan, Nov. 8, 1973, 48-125683; Dec. 21, 1973, 48-143297

Int. Cl.² F02B *75/10*

U.S. Cl. 60—274 **6 Claims**

1. A method of reducing harmful components contained in exhaust gases from an internal combustion engine having at least two sequentially operative combustion chambers and a device to oxidize the hydrocarbon and cabon monoxide constituents of the exhaust gases, comprising the steps of

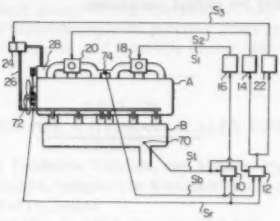
sensing an engine load,

setting a predetermined near stoichiometric air/fuel ratio of the mixture to be delivered to the engine,

delivering to one of said combustion chambers a lean mixture which is the leanest one at which stable combustion in the combustion chamber is maintained and which is kept substantially constant independently of variation in the engine load,

presetting an air/fuel ratio of the mixture variable in dependence on the engine load, at which oxidization of carbon monoxides in the oxidizing device takes place,

delivering to the other of said combustion chambers a rich mixture which is substantially richer than said preset air/fuel ratio and is variable in dependence on variation in the engine load, said rich mixture being leaner than said



near stoichiometric ratio when the engine load exceeds a predetermined medium level,

delivering to all the combustion chambers an air/fuel mixture, the air/fuel ratio of which is substantially equal to said near stoichiometric ratio substantially when the engine load exceeds said predetermined medium level, and

delivering additional air into the engine exhaust gases substantially when the air/fuel ratio of the rich mixture reaches said near stoichiometric level.

4,033,123

INTERNAL COMBUSTION ENGINE EXHAUST GAS AFTER-BURNING SYSTEM

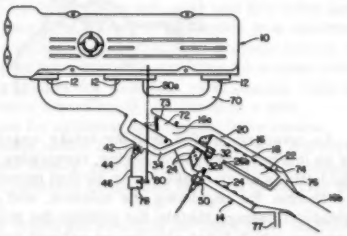
Kenji Masaki, and Yoshio Ookubo, both of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Division of Ser. No. 496,018, Aug. 8, 1974, abandoned. This application Jan. 6, 1976, Ser. No. 646,748

Claims priority, application Japan, Aug. 17, 1973, 48-92291

Int. Cl.² F01N *3/14*

U.S. Cl. 60—286 **4 Claims**



1. An exhaust gas after-burning system of an internal combustion engine, the engine having a plurality of exhaust ports and the system including:

a thermal reactor communicating with the plurality of exhaust ports and having an after-burning chamber wherein a spark plug is provided to ignite a combustible mixture for after-burning unburned noxious compounds contained in the exhaust gas received from the exhaust ports;

a secondary air injection nozzle disposed in the after-burning chamber for injecting secondary air thereinto and connected through a heatable chamber to a secondary air source;

a first conduit connecting the after-burning chamber to the

plurality of exhaust ports to receive exhaust gas for feeding into the after-burning chamber; and

a second conduit connected at one end to the first conduit to receive a portion of the exhaust gas;

a fuel injection nozzle disposed in the second conduit for spraying additional fuel to form additional fuel mist within the exhaust gas therein; and

a fuel vaporizer connected to the other end of the second conduit and disposed in the after-burning chamber to distribute the additional fuel mist in the after-burning chamber for instant vaporizing.

4,033,124

ARRANGEMENT FOR DERIVING INTAKE NEGATIVE PRESSURE FROM AN INTERNAL-COMBUSTION ENGINE

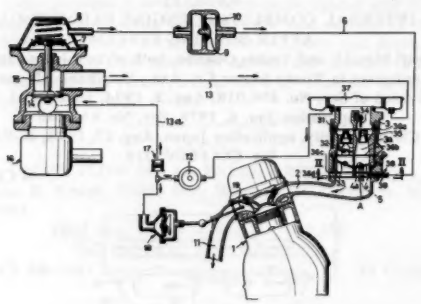
Urataro Asaka; Shuichi Yamazaki, both of Kamifukuoka; Mitsugi Niitsu, Higashikurume, and Sakuji Arai, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1975, Ser. No. 643,938

Claims priority, application Japan, Dec. 27, 1974, 49-148904

Int. Cl.² F02B 75/10

U.S. Cl. 60—290 **4 Claims**



1. An arrangement for deriving intake negative pressure from an internal-combustion engine, comprising a carburetor in the latter, with an intake for an air-fuel mixture, a throttle valve therein for regulating the mixture, and at least one longitudinal passage therein for guiding the mixture toward the engine; which latter also has an exhaust passage leading therefrom; wherein said throttle valve has a shaft substantially transversely disposed in one of said passages of the carburetor, the latter being fitted with at least one discharge opening in a side wall of said intake passage to derive negative pressure from said carburetor for regulating and controlling the engine operation; an insert member being interposed between a portion of said carburetor and said intake passage, and wherein a connecting tube is integrally formed in said insert member but projects therefrom, which tube is in communication with said dishcarge opening; the latter being provided downstream of said throttle valve in the flow of the mixture, in an area downstream from and sheltered by said valve shaft; whereby to avoid accumulation and discharge of condensed fuel from said carburetor to said discharge opening.

4,033,125

AIR FLOW CONTROL MEANS FOR AUTOMOBILE ENGINE EXHAUST GAS CLEANING MEANS

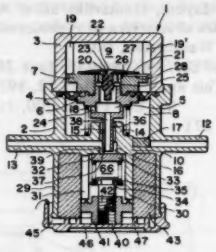
Masami Inada, Toyoake; Yasuhiro Kawabata, and Katsujiro Sato, both of Toyota, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Sept. 18, 1975, Ser. No. 614,692

Claims priority, application Japan, Nov. 26, 1974, 49-136506

Int. Cl.² F01N 3/10

U.S. Cl. 60—290 **2 Claims**



1. In an automobile engine utilizing an intake manifold and exhaust gas cleaning means which comprises an auxiliary air supply source for supplying auxiliary air through auxiliary air passage means and auxiliary air flow control means therein to an exhaust system of the automobile engine for effecting oxidation of unburnt constituents in engine exhaust gas, air flow control valve means for actuating said auxiliary air flow control means to permit the supply of auxiliary air flow to the exhaust gas cleaning means comprising:

a housing having chamber means therein, said housing being provided with a first inlet port communicating said chamber means with said engine intake manifold;

a second inlet port for introducing atmospheric pressure into an outlet port communicating said chamber means with said auxiliary air flow control means;

means housed in said chamber means in response to the engine intake pressure for moving from a normally unactuated position to an actuated position for interrupting the supply of said engine intake pressure from the first inlet port to the outlet port; valve means disposed between said second inlet port and said outlet port for normally closing the former;

valve actuating means for opening said normally closed valve means in response to the engine intake pressure level from said first inlet port;

said intake pressure responsive means including a diaphragm defining in said chamber means a first chamber and a second closed chamber, said first chamber being connected with said first inlet port and said outlet port;

said diaphragm carrying said valve actuating means which comprises a hollow projecting member;

said hollow projecting member being adapted to cooperate with said normally closed valve means to shift the same apart from the second inlet port when the diaphragm is deflected under the influence of the engine intake pressure; and

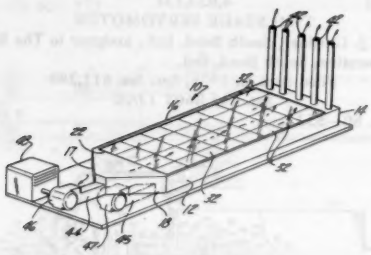
aperture means communicating said first chamber through the hollow interior of the projecting member with the outlet port, whereby when the projecting member engages said normally closed valve means to shift the same from the second inlet port, said communication of the first chamber with the outlet part through the hollow interior of the projecting member is interrupted and at the same time the atmospheric pressure is introduced into the outlet port from the second inlet port.

4,033,126

SOLAR ENERGY DEVICE

Elwood L. Newland, 2434 Clayward St., Flint, Mich. 48506

Filed Apr. 9, 1975, Ser. No. 566,213
Int. Cl.² F03G *7/02*
U.S. Cl. 60—398 **7 Claims**



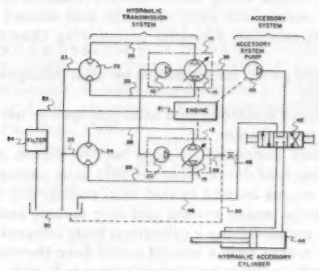
1. Apparatus for the utilization of solar energy comprising a heat collector having an air inlet and an air outlet, an air powdered turbine coupled to the inlet so that the air passing into said inlet also passes through said turbine and at least one vertically extending exhaust stack attached to said outlet.

4,033,127

HYDRAULICALLY-POWDERED VEHICLE ACCESSORY SYSTEM SUPERCHARGED BY HYDRAULIC VEHICLE DRIVE SYSTEM

Jacob Amstutz, and Paul G. Amstutz, both of Canby, Oreg., assignors to Jacob Amstutz, Canby, Oreg.

Filed June 4, 1976, Ser. No. 692,949
Int. Cl.² F15B *13/06, 13/09*
U.S. Cl. 60—455 **3 Claims**



1. In a vehicle having an engine and a ground-engaging traction apparatus driven by said engine for moving said vehicle over the ground, the combination which comprises:

a. a hydraulic fluid reservoir mounted on said vehicle;

b. hydraulic transmission means mounted on said vehicle comprising hydraulic transmission motor means for driving said traction apparatus and hydraulic transmission pump means driven by said engine and hydraulically coupled with said transmission motor means for driving sayd transmission motor means, said transmission pump means having a sump line for receiving hydraulic fluid from said reservoir and discharge means for discharging hydraulic fluid from said transmission pump means;

c. a hydraulically-powered accessory system mounted on said vehicle comprising a hydraulic accessory pump separate from said transmission pump means and driven by said engine, and a hydraulically-powered accessory driven by the discharge from said accessory pump, the intake of said accessory pump being operatively coupled to said discharge means of said transmission pump means so as to receive said hydraulic fluid therefrom;

d. shunt means, operatively coupled to said discharge means of said transmission pump means in parallel relation to said intake of said accessory pump, connecting said discharge means to said reservoir for shunting to said reservoir hydraulic fluid discharged from said discharge means in excess of that received by said accessory pump; and

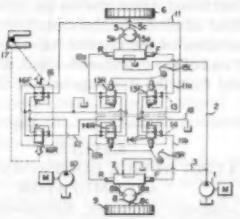
e. means associated with said shunt means for maintaining a superatmospheric pressure of said fluid at said intake of said accessory pump during operation of said accessory pump, said superatmospheric pressure being greater than the fluid pressure in said reservoir during said operation.

4,033,128

CONTROLS FOR A HYDRAULICALLY DRIVEN VEHICLE

Ryozo Aoyama; Yukinobu Matsuda, and Mitsuo Urushima, all of Hirakata, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Oct. 8, 1975, Ser. No. 620,816
Claims priority, application Japan, Oct. 8, 1974, 49-120931[U]
Int. Cl.² F15B *11/16*
U.S. Cl. 60—484 **4 Claims**



1. Controls for a hydraulically driven vehicle, comprising:

a. a first hydraulic pressure source,

b. a first valve means connected in a continuous manner with said first hydraulic pressure source,

c. a pair of motors connected in a continuous manner with said first valve means,

d. a second hydraulic pressure source for a pilot circuit,

e. a second valve means for actuating said first valve means whereof one port thereof is connected in a continuous manner with said second hydraulic pressure source, and another port is connected in a continuous manner with an operating means for said first valve means, with said second valve means being connected to a tank,

f. first means for actuating said second valve means,

g. a third valve means for controlling right and left revolutions of the vehicle, said third valve means being disposed in a pilot operated circuit and held in a connected position, and

h. a second means for actuating the third valve means.

4,033,129

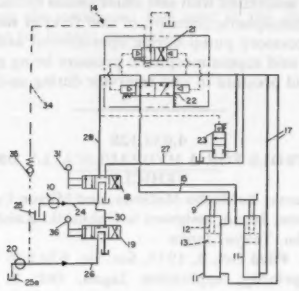
HYDRAULIC FEED CONTROL SYSTEM FOR ROTARY DRILL

Robert B. Hetzler, Emlenton, and Gerald L. Pierson, Franklin, both of Pa., assignors to Chicago Pneumatic Tool Company, New York, N.Y.

Filed June 1, 1976, Ser. No. 691,511
Int. Cl.² F15B *13/09, 15/22*
U.S. Cl. 60—486 **11 Claims**

1. An hydraulic feed control system for hydraulically feeding and retracting a rotary rock drill relative to the work, comprising an hydraulic piston cylinder selectively operable for feeding or retracting the drill, and hydraulic circuit con-

nected to opposite ends of the cylinder for applying fluid to a selected end of the cylinder and simultaneously draining fluid from the opposite end to a sump, an hydraulic feed pump connected for pumping fluid from the sump, a manipulative primary control valve having an inlet connection with a discharge end of the pump and having a discharge connection for admitting fluid from the pump to the circuit, the control valve



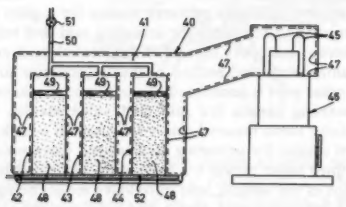
being selectively operable for determining the end of the cylinder to which fluid from the pump is to be applied, pilot operable directional valve means in the circuit having response to fluid admitted to the circuit in accordance with a selected operation of the control valve to direct the fluid to the selected end of the cylinder to which it is to be applied and to direct fluid from the opposite end of the cylinder back to sump.

4,033,130

HEATING DEVICE COMPRISING A HEAT ACCUMULATOR

Matthias Leonardus Hermans, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 571,405, April 24, 1975, abandoned.
This application June 18, 1976, Ser. No. 697,358
Claims priority, application Netherlands, May 3, 1974, 7405947
Int. Cl.² F28D *15/00;* **F03G** *7/06*
U.S. Cl. 60—523 **14 Claims**



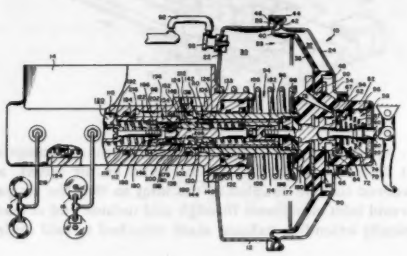
4. In a heating system operable in a selected temperature range, including a first container which is a heat pipe formed by walls having inner surfaces which define a first closed space, and within said space a second container formed by walls having outer surfaces, and also having inner surfaces which define a second closed space containing a quantity of heat-accumulating material, and said heating system further including means for heating said heat-accumulating material, and in said first space a quantity of heat transport medium that cycles in the operating temperature range of the system, between vapor and liquid states, and continuous capillary material on and communicating between said inner and outer wall surfaces, the improvement in combination therewith comprising in said second space a quantity of pressure-equalizing vaporizable liquid which has in the operating temperature range of said heating system, vapor pressure characteristics generally similar to those of said heat-transport medium, whereby the vapor pressure in said first and second spaces is, in said operating temperature range, generally the same.

4,033,131

TWO STAGE SERVOMOTOR

Delbert J. Gardner, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Sept. 8, 1975, Ser. No. 611,288
Int. Cl.² B60T *13/20*
U.S. Cl. 60—553 **7 Claims**



1. In a power brake apparatus having a servomotor with a control means for transferring an output force of a wall means from a first piston means to a concentric second piston means to produce an additional operational force to activate the wheel brakes in a vehicle in response to an operator input force, said control means comprising:

a housing having a first diameter bore and a second diameter bore therein, said first piston means being located in said first diameter bore to establish a first pressurizing chamber and a relief chamber therewith, said second piston means being concentrically located in the first piston means and extending into said second diameter bore to establish a second pressurizing chamber therewith;

said second piston means having an axial passageway therethrough;

sleeve means located in said axial passageway having a first radial bore therein;

stop means connected to said second piston means for retaining said sleeve means in said axial passageway;

resilient means located in said axial passageway for urging said sleeve means toward said stop means; and

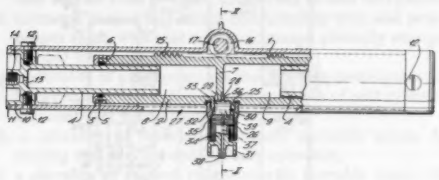
actuator means having a cylindrical body concentric to said sleeve means with a second radial bore therein, the first pressurizing chamber being connected with said axial passageway through said first and second radial bore body said cylindrical having a groove therein in communication with said relief chamber said actuator means intially operating said servomotor to allow said wall means to simultaneously move said first and second piston means in said first and second diameter bores to establish a first pressurizing force for activating said wheel brakes; a face on said sleeve means, a first seal means mounted adjacent said sleeve means, said first pressurizing force acting on said face to move said first radial bore away from the second radial bore by overcoming said resilient means, the first seal means interrupting communication-through said first and second radial bores; said actuator means thereafter moving said groove into communication with said first radial bore to allow fluid in said first pressurizing chamber to escape through said first radial bore and said groove into the relief chamber and permit said wall means to move said second piston means in said second diameter to develop said additional operational force.

4,033,132

POSITION-TRANSMITTING EQUIPMENT

Anthony Victor Norton Priest, Harpenden, and Murray Arnold Schorr, Bletchley, both of England, assignors to Alfred Walter Barker, Guernsey, Channel Islands

Filed Aug. 4, 1975, Ser. No. 601,407
Int. Cl.[2] F15B *7/10, 7/08*
U.S. Cl. 60—572 **11 Claims**



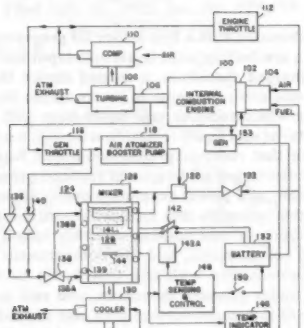
1. Position-transmitting apparatus comprising:
A. a transmitter unit including
a. a housing having two ends,
b. a cylinder and
c. means for moving the cylinder axially within the housing in accordance with position information to be transmitted,
d. a transverse partition fixedly secured to and dividing said cylinder into two working chambers,
e. an individual tubular plunger fixed to each end of said housing and having sealing telescopic relationship to said cylinder so that axial movement of the cylinder with respect to the housing causes relative displacement of said plungers and the cylinder to effect differential adjustment of the volumes of said working chambers; and
B. a receiver unit including a double-acting hydraulic actuator having working chambers adapted for connection via said plungers to the working chambers of the cylinder of said transmission unit, thereby to respond to adjustment of said cylinder within said housing.

4,033,133

START UP SYSTEM FOR HYDROGEN GENERATOR USED WITH AN INTERNAL COMBUSTION ENGINE

John Houseman, Pasadena, and Donald J. Cerini, Flintridge, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed Mar. 22, 1976, Ser. No. 668,783
Int. Cl.[2] F02B *33/44*
U.S. Cl. 60—606 **9 Claims**



1. In combination, an internal combustion engine, which produces hot exhaust gas when operative, and a hydrogen product gas generator,
said internal combustion engine having means for applying an air/fuel mixture to said engine, and means attached to the engine for producing air under pressure,
said hydrogen product gas generator including
first walls defining a hollow chamber, said chamber having an input end, an output end, and a center portion,
a catalytic bed positioned in said center portion,
second walls forming a spiral passageway around said first walls, said spiral passageway having an input end and an output end,
fuel atomizer means having a fuel input, an atomizing air input, a vaporizing air input and output,
air/fuel mixer means having a first input connected to said fuel atomizer output, a second input adjacent sid first input connected to said spiral passageway output end, and an output connecting to said hollow chamber input end,
first valve means having one position for permitting hot exhaust gas to be applied from said engine to said spiral passageway input end to thereby heat the enclosed catalytic bed to an operating temperature, and a second position for blocking further gas application,
means defining a source of liquid hydrocarbon fuel,
second valve means having one position for applying fuel from said source to said fuel atomizer means fuel input and a second position for blocking said fuel input,
means for applying air from said means attached to the engine to said fuel atomizer means atomizing air input for atomizing fuel applied to said fuel atomizer means,
third valve means having a first position for applying air from said means attached to the engine to said spiral passageway input end and a second position for terminating the application of air, and
fourth valve means having a first position for connecting said hollow chamber output end to said means for applying an air/fuel mixture to said engine, and a second position for venting the hollow chamber output to the atmosphere whereby following engine start up, said first valve means is placed in its first position, said second, third and fourth valve means are placed in their second positions, thereby hot engine exhaust gas can heat said catalytic bed up to its operating temperature and then be exhausted to the atmosphere, and upon the catalytic bed reaching its operating temperature, said first valve means is placed in its second position and said second, third and fourth valve means are placed in their first positions whereby vaporized hydrocarbon fuel and air are applied to said catalytic bed to produce a hydrogen rich product gas which is applied to said engine.

4,033,134

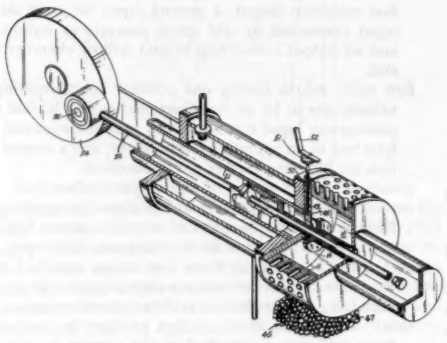
HEAT ENGINE

Arthur P. Bentley, P.O. Box 327, Ulm, Mont. 59485

Filed June 11, 1976, Ser. No. 695,062
Int. Cl.[2] F03G *7/02;* **F02G** *1/04*
U.S. Cl. 60—641 **10 Claims**

1. In a heat engine in which air constitutes the fluid medium,
a. a heat chamber defined by a metallic heat ring, a first end wall of heat insulating material formed with a central opening, and a second end wall having a central opening coaxial with the opening in the first end wall;
b. a closed cylindrical extension mounted on said second end wall about the opening therein and extending away from said heat chamber;
c. a cylinder mounted on said first end wall about the opening therein, extending away from said first end wall and having an open end;
d. a cooling jacket about said cylinder and having a liquid inlet and a liquid outlet;

e. a piston reciprocal in said cylinder and having outer and inner ends;
f. a connecting rod having one end pivoted to the outer end of said piston and extending through the open end of said cylinder;
g. a fly wheel to which the other end of said connecting rod is pivotally connected;
h. a piston rod secured to the inner end of said piston and extending through the opening in the first end wall, the heat chamber, the opening in the second end wall and into said extension;
i. a valve in said heat chamber having a bore slideably receiving said piston end and moveable into a position closing the opening in the first end wall;



j. cooperating elements of a first dash pot on the inner end of said piston and said valve which are effective on an inward stroke of the piston to cushion impact of the piston with said valve and finally cause the valve to pop into a position clearing the opening in said first end wall;
k. cooperating elements of a second dash pot on said valve and said piston rod at the end thereof remote from said heat chamber;
l. a throttle passage in said first end wall communicating between said heat chamber and said cylinder; and
m. adjustable means for varying the effective area of said passage.

4,033,135

PLANT AND PROCESS FOR VAPORIZING AND HEATING LIQUID NATURAL GAS

Charles Mandrin, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 29, 1976, Ser. No. 653,594

Claims priority, application Switzerland, Feb. 7, 1975, 8943/75; July 9, 1975, 8943/75

Int. Cl.² F01K *23/10*

U.S. Cl. 60—648 **12 Claims**

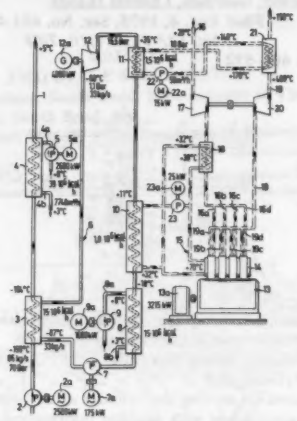
1. A plant for vaporizing and heating liquid natural gas comprising

means defining a predetermined flow path for a flow of liquid natural gas;

means in said flow path to place the flow of liquid natural gas in heat exchange relation with a first heating agent;

a circuit for a second heating agent including at least one heat exchanger for placing the second heating agent in heat exchange relation with the flow of liquid natural gas, a pump for pumping the second heating agent through said circuit, at least two secondary heat exchangers for heating of the second heating agent, and a turbine for expansion of the heated second heating agent to perform work;

a diesel engine plant including an air intake means, an exhaust gas outlet means and a coolant circuit for passing a coolant through said diesel engine plant and said air intake means, said coolant circuit being connected to one of said secondary heat exchangers of said second heating agent circuit in heat exchange relation with the second heating agent for heating of the second heating agent and



said exhaust gas outlet means being connected with the other of said secondary heat exchangers in heat exchange relation with the second heating agent for heating of the second heating agent.

4,033,136

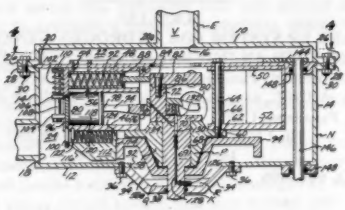
VAPOR ACTUATED POWER GENERATING DEVICE

Robert C. Stewart, Rte. 5, Box 374, Spokane, Wash. 99200

Filed Nov. 20, 1975, Ser. No. 633,679

Int. Cl.² F01K *25/00*

U.S. Cl. 60—671 **7 Claims**



1. In combination with a first device for generating heat that transforms a low boiling point liquid into vapor under pressure that is discharged therefrom; a second device that receives said vapor and cools the same to return to the liquid state; a third device which receives said liquid from said second device and returns said liquid to said first device, a power generating device that receives pressurized vapor from said first device and discharges said vapor at reduced pressure to said second device, said power generating device including:

a. a housing assembly that includes a partition that divides the interior of said housing assembly into a first and a second compartment, said first compartment at all times in communication with said first device to receive said vapor under pressure therefrom, and said second compartment in communication with said second device;

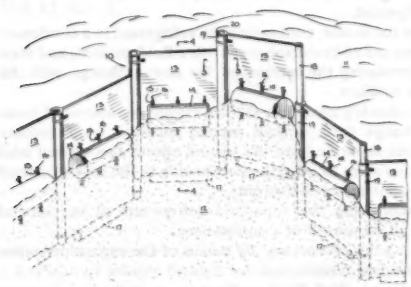
b. a cylinder defining assembly disposed in a fixed position in said housing assembly, said cylinder defining assembly including a plurality of circumferentially spaced, radially extending first cylinders, said first cylinders having first open inwardly disposed ends in communication with said first compartment and second outwardly disposed open ends in communication with said second compartment;

c. a power output shaft rotatably supported in said housing assembly and extending outwardly therefrom;
d. a plurality of first pistons slidably and sealingly mounted in said first cylinders, said pistons having first and second ends, said first ends in communication with said first compartment and at all times exposed to said vapor under pressure;
e. a plurality of piston rods having first and second ends, said second ends pivotally connected to said first pistons;
f. eccentric means that rotate concurrently with said power output shaft, with said eccentric means pivotally engaged by said first ends of said piston rods;
g. a plurality of passage means that provide communication between said first compartment and each of said cylinders adjacent said second end of the latter;
h. a plurality of first independently movable means for closing said second ends of said cylinders;
i. a plurality of second independently movable means for closing said passage means;
j. first means actuated by the rotation of said power output shaft for sequentially moving each of said first movable means to an open position when said piston associated therewith has moved to the innermost position and so maintaining said first means as vapor under pressure in said first compartment forces said piston outwardly to the outermost position thereof, with said first means sequentially closing each of said second ends of said cylinders after said piston associated therewith has moved to said outermost position, and each of said pistons as it moves from said innermost to said outermost position by vapor under pressure in said first compartment causing said power output shaft to rotate due to the differential in vapor pressure on said first and second ends of said pistons; and
k. second means actuated by the rotation of said power output shaft to sequentially maintain each of said second movable means in an open position as said piston associated therewith moves from an outermost to an innermost position to permit said vapor in communication with said first and second ends of said piston to be at substantially equal pressure to minimize the energy required to move said piston from said outermost to said innermost position and said second means sequentially closing each of said passage means as said piston associated therewith starts to move from said outermost to said innermost position.

4,033,137
ARTICULATED FLOATING BARRIER

James J. Geist, 31 Tilton St., New Haven, Conn. 06511

Filed July 12, 1973, Ser. No. 378,419
Int. Cl.² E02B *15/04*
U.S. Cl. 61—1 F 5 Claims

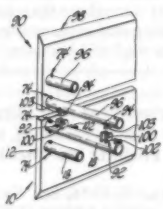


1. An articulated floating barrier for containing oil or other debris on the surface of a body of water comprising:
a plurality of buoyant sections, each section being substantially rectangular in profile and having a top, a bottom, and two ends and having its center of buoyancy located above its center of gravity so that the section will float stably upright in a body of water with its top and bottom substantially horizontal and its ends substantially vertical and
sliding seal means attached to adjacent ends of adjacent sections for sealingly connecting the adjacent sections end to end while allowing relative vertical sliding motion between the sections in response to wave-created differential buoyant forces acting on the adjacent sections, wherein the sliding seal connecting means comprising:
a vertical disposed slide member sealingly attached to one end of one section and
a mating slotted member sealingly attached to the adjacent end of the adjacent section, the slotted member being open ended and slidably engaging the slide member to permit relative vertical sliding movement of the slide member beyond each end of the slotted member as a result of wave-created differential buoyant forces acting on the adjacent sections.

4,033,138
TRENCH SHORING ASSEMBLY WITH STACKING ACCESSORY

James L. Griswold, 513 Morningside Drive, Battle Creek, Mich. 49015

Filed Feb. 9, 1976, Ser. No. 656,150
Int. Cl.² E21D *5/00*
U.S. Cl. 61—41 A 5 Claims



1. A trench shoring assembly of the type including a pair of interconnected spaced wall means, said assembly comprising: connecting means for interconnecting the spaced wall means, said connecting means having ends adapted for attachment to the spaced wall means, and lug means extending transversely from said connecting means and spaced from said wall means along the length thereof for juxtaposed disposition and attachment to mating lug means extending from similar connecting means associated with a second pair of spaced wall means for interconnecting vertically stacked sets of spaced wall means.

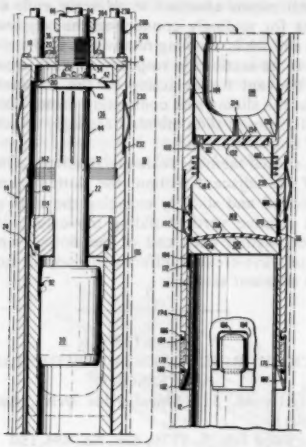
4,033,139
PILE DRIVING HAMMER, APPARATUS AND METHOD

Leonard L. Frederick, 15 Crestview Terrace, Whippany, N.J. 07981

Division of Ser. No. 440,861, Feb. 8, 1974, Pat. No. 3,927,722.
This application Aug. 28, 1975, Ser. No. 608,568
Int. Cl.² E02D *7/10*
U.S. Cl. 61—53.5 26 Claims

1. An apparatus for driving a pile from an offshore installation, the installation including a structure having at least one conveyor means which extends below the surface of the water, the conveyor means defining a passage therethrough for the reception of a pile member to be driven, the apparatus comprising:
a. a pile driving hammer including an elongated housing member, means mounted to said housing for guiding said hammer within the passage of said conveyor means and retaining the alignment of said hammer with respect to said conveyor means, anvil means which engage the pile member to be driven, and a pocket formed by the housing

member and the anvil means in the area of engagement of the pile member and said anvil means into which a pressurized fluid is fed thereby displacing any water from the vicinity of engagement of the anvil means with the pile member to be driven;



b. a support structure mounted to said hammer for suspending said hammer throughout the span of its operation; and

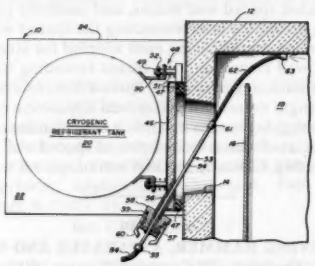
c. means suspending said support structure throughout the span of operation of said hammer.

4,033,140

REFRIGERATION SYSTEM FOR SHIPPING CONTAINER

David J. Klee, and Jack H. Godtfring, both of Emmaus, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 2, 1976, Ser. No. 673,336
Int. Cl.² F25B *41/04*
U.S. Cl. 62—223 **9 Claims**



1. A cryogenic refrigeration system, for detachable mounting on a shipping container having a porthole, comprising,

a. a cryogenic refrigerant storage tank,

b. support means including locking assemblies for detachably securing said storage tank to said container externally of the porthole,

c. a porthole cover permanently attached to and carried by said refrigeration system, said cover being positioned relative to said locking assemblies such as to automatically cover the porthole when said refrigeration system is mounted on the shipping container by said locking assemblies,

d. a refrigerant injection tube supported by said porthole cover and positioned at an angle relative to the vertical plane of said cover such as to pass through said porthole and having a length such as to terminate adjacent the upper, internal wall of the shipping container, said injection tube being connected by a refrigerant line to said refrigerant tank,

e. a temperature sensor for sensing the temperature in said container, said temperature sensor being connected to one end of a signal line,

f. a temperature controller connected to the opposite end of said signal line,

g. a refrigerant flow control valve in said refrigerant line intermediate said refrigerant tank and said injection tube,

h. a valve actuator connected to said refrigerant flow control valve, and

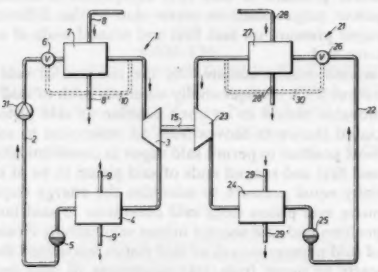
i. a signal line connected from said temperature controller to said valve actuator for controlling the flow of cryogenic refrigerant as a function of the temperature sensed in the container by said temperature sensor.

4,033,141

METHOD FOR THERMAL RUNNING OF A HEAT PUMP PLANT AND PLANT FOR CARRYING OUT THE METHOD

Berth Ulrik Gustafsson, Osterskar, Sweden, assignor to Projectus Industriprodukter AB, Stockholm, Sweden

Filed Aug. 27, 1975, Ser. No. 608,225
Claims priority, application Sweden, Sept. 5, 1974, 7411260
Int. Cl.² F25B *27/02*
U.S. Cl. 62—238 **16 Claims**



1. Method for thermal running of heat pump plant, characterized by

a. transferring heat in a first circuit by means of indirect heat-exchange from a first fluid medium from another source separate from the first circuit, at a first inlet temperature to a refrigerant flowing in the first circuit to vaporize the refrigerant,

b. driving an expansion motor by means of the vaporised refrigerant,

c. after the motor, condensing the refrigerant in a condenser by means of heat-exchange with a fluid coolant, and then recirculating the refrigerant for heat-exchange with the first medium,

d. transferring heat in a second circuit by means of heat-exchange from a fluid second medium from another source separate from the second circuit at a second inlet temperature to a refrigerant flowing in the second circuit to vaporize the refrigerant,

e. compressing the vaporized refrigerant of the second circuit by means of a compressor,

f. driving the compressor by means of the expansion motor in the first circuit, and

g. heating a third fluid medium to an outlet temperature higher than both the first inlet temperature of the first medium and the second inlet temperature of the second medium in a condenser in the second circuit by means of heat-exchange with the compressed vapour of the refrigerant of the second circuit, which after condensation in

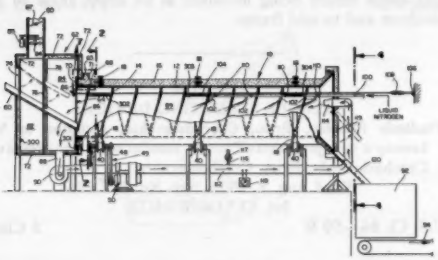
said condenser is recirculated for heat-exchange with the second medium.

4,033,142

APPARATUS FOR REFRIGERATING MATERIALS

John B. Schorsch, Rydal; William E. Graul, Drexel Hill, both of Pa., and David Barash, Ridgefield, Conn., assignors to Union Corporation, Verona, Pa.

Continuation of Ser. No. 365,117, May 30, 1973, Pat. No. 3,906,743. This application June 17, 1975, Ser. No. 587,546
The portion of the term of this patent subsequent to Sept. 23, 1992, has been disclaimed.
Int. Cl.² F25D *25/02*
U.S. Cl. 62—381 16 Claims



1. A refrigeration means, comprising:
a. a rotatable drum having means to receive and to discharge material; said drum having an interior configuration which further comprises transport means for advancing the material longitudinally within said drum upon rotation of the drum; and wherein the drum is supported for rotation on a plurality of rings, said rings having, as part thereof, insulated force-transmitting members;
b. rotation means engaging said drum for rotating said drum; and
c. refrigeration means within said drum to refrigerate said material while it is within said drum.

4,033,143

CLIP RING

Doreen Elizabeth Michael, 4115 208th St., Langley, British Columbia, Canada (V3A 2H3)

Filed Feb. 11, 1976, Ser. No. 657,214
Int. Cl.² A44C *25/00*; A44B *13/02*
U.S. Cl. 63—2 5 Claims

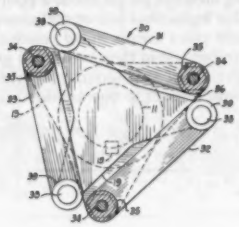
1. Piece of jewelry formed from a resilient, single piece of material and having overlapping inner and outer ends; an opening adjacent but spaced from the extremities of the outer end; a prong attached to that part of the rim of the opening adjacent the extremity of the outer end; a radially oriented part of the inner end extending through said opening to abut said prong to maintain a predetermined shape for the ring.

4,033,144

FLEXIBLE COUPLING

Clifford H. Allen, 13109 Westchester Trail, Chesterland, Ohio 44026

Filed Feb. 18, 1976, Ser. No. 659,129
Int. Cl.² F16D *3/62*
U.S. Cl. 64—12 10 Claims



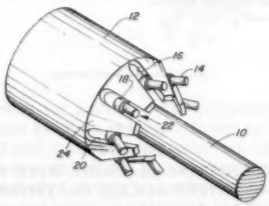
1. A flexible coupling for connecting a rotary drive to a rotary load and for accommodating axial misalignment between said drive and load comprising:
an input hub on said rotary drive,
an output hub on said rotary load,
an intermediate member located between said hubs,
a tripodic connection assembly between said input hub and said intermediate member, and
a tripodic connection assembly between said intermediate member and said output hub,
said tripodic connection assemblies each comprising three linking elements generally arranged in triangular form in a plane perpendicular to the respective hub axis and connected at rigid connections to said intermediate member at one end and to the respective hub at the other end, said connections for corresponding ends being at symmetrically spaced locations around a circumscribing circle,
said linking elements being adapted to flex intermediate their ends to accommodate misalignment between the respective axes of said hubs, the flexing stresses consisting essentially of bending and torsion.

4,033,145

CONSTANT ANGULAR VELOCITY JOINT

John C. Warner, Ithaca, N.Y., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 5, 1975, Ser. No. 637,901
Int. Cl.² F16D *3/30*
U.S. Cl. 64—21 23 Claims



1. A universal joint for the transmission of rotational movements between two shafts; comprising:
a first driving member rigidly associated with one of said two shafts;
a pivot means rigidly fixed to said first driving member;
said pivot means extending obliquely to said first driving member and generally extending in a direction to overlie said first driving member;

a second driving member rigidly associated with the other of said two shafts;

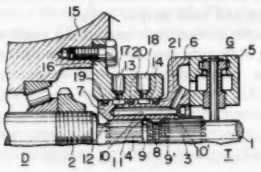
said second driving member having a cavity and grove means intersecting the cavity, said grove means corresponding in number and spacing to said pivot means, each grove means receiving a pivot means and said cavity receiving a part of said first driving member whereby said first driving member pivots about a point located in said cavity on the logitudinal axis of said second driving member and said pivot means move relative to said second driving member and in their respective grooves when the logitudinal axes of said driving member are angularly arranged with respect to one another.

4,033,146

GOVERNOR SUPPORTING MEMBER AND COUPLING MEANS

Kojiro Kuramochi, and Yutaka Taga, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Mar. 2, 1976, Ser. No. 663,051
Claims priority, application Japan, Dec. 5, 1975, 50-143866
Int. Cl.² F16D *3/06*
U.S. Cl. 64—23 **5 Claims**



1. A governor supporting assembly serving as coupling means between a pair of shafts for mounting a governor to rotate jointly with one of said shafts comprising a governor housing having secured thereto a cylindrical extension member arranged for engagement around portions of both said shafts, external axially extending splines formed on said portions of both said shafts, internal axially extending splines formed in said cylindrical extension member in meshing engagement with said external splines of said portions of both said shafts and retaining means in engagement between said cylindrical extension member and either one of said shafts for preventing axial movement therebetween while permitting axial movement between said cylindrical extension member and the other of said shafts.

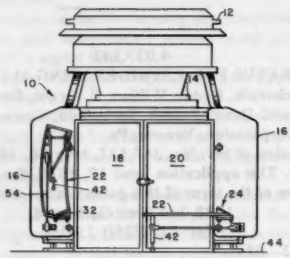
4,033,147

CIRCULAR KNITTING MACHINE WITH PIVOTALLY MOUNTED ACCESS PLATFORM

Herbert Ray King, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed May 5, 1975, Ser. No. 574,502
Int. Cl.² D04B *9/00*
U.S. Cl. 66—8 **1 Claim**

1. A circular knitting machine having a frame and a means to produce a circular knitted fabric comprising: means mounting a platform to allowing said platform to be moved to positions substantially both perpendicular or parallel to the vertical centerline of said machine, said means including hinge means to allow said platform to be pivoted about the hinge both outwardly and vertically upward adjacent said frame,



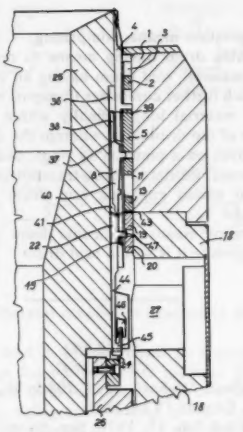
said hinge means being mounted at an acute angle to said platform and to said frame.

4,033,148

NEEDLE SELECTING DEVICE

Vladimir Mureso, Brno, Czechoslovakia, assignor to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi of Czechoslovakia, Brno, Czechoslovakia

Filed Aug. 8, 1975, Ser. No. 603,016
Int. Cl.² D04B *15/78*
U.S. Cl. 66—50 R **5 Claims**



1. In a knitting machine having a support, a needle bed, the needle bed and support being mounted for relative rotation, a plurality of grooves disposed in spaced relation in the needle bed to form needle tricks, a needle slidably mounted in the upper portion of each groove, an elongated slider movably mounted in each groove below the needle and having a recessed upper end adapted for overlying cooperation with the lower end of the needle, an elongated selector slidably mounted in the groove below the portion of the slider, the improvement which comprises a needle selecting device wherein an energizable selecting magnet means and a permanant magnet means are fixedly associated with the support for engagement with means on one side of the lower portion of the selector, and cam means fixedly associated with the support and cooperable with the bottom surface of the lower portion of the selector for actuating the selector to engage the lower end of the slider when the selecting magnet means is energized, wherein the upper portion of the selector is restrained from radial movement in the groove; wherein the central portion of the selector is made resilient whereby the other side of the lower end of the selector may be acted upon

by said cam means, not withstanding the radial movement towards the permanent magnet means; wherein the upper end of the slider is confined between the bottom of the associated groove and the bottom portion of the overlying needle to define a fulcrum on the upper portion of the slider; and wherein the upper portion of the selector and the lower portion of the slider have cooperating camming surfaces whereby an upward movement of the selector along the groove causes a pivot of the lower portion of the slider about said fulcrum.

4,033,149

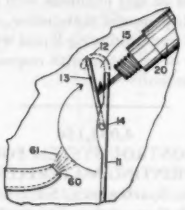
LATCH CLOSER IN COMBINATION WITH A CLOSED LATCH DETECTOR

Angel C. Avalle, Pomona, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed July 26, 1976, Ser. No. 708,908

Int. Cl.² D04B *35/18*

U.S. Cl. 66—111 **2 Claims**



1. A unit attachable to a knitting machine for the purpose of rotating the open latch of a knitting needle with a broken hook which had been previously controlled to form a tuck stitch to a closed position so as to trigger sensing equipment of the machine that is set to detect a latch in the closed position,

said unit in the form of a mount to which an air nozzle is fixed, said nozzle fitted with means to attach to a supply of pressurized air, and said nozzle shaped to blow air axially along said knitting needle of the machine towards the hook end of the said needle to close said latch before it passes said sensing equipment,

said mount fitted with means to attach to said machine.

4,033,150

CIRCULAR KNITTING MACHINE FOR PRODUCING DETACHABLE STRIPS OF KNITTED FABRIC

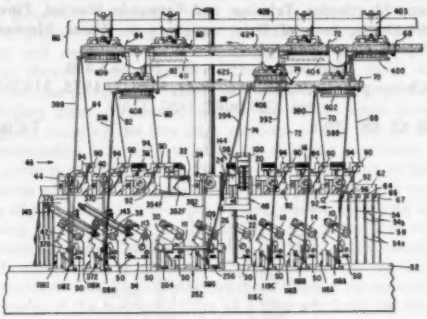
Lester Mishcon, Miami Beach, Fla., and John Christopoulos, Brentwood, N.Y., assignors to The Singer Company, New York, N.Y.

Continuation of Ser. No. 564,020, April 1, 1975, abandoned. This application Nov. 10, 1976, Ser. No. 740,513

Int. Cl.² D04B *15/58*

U.S. Cl. 66—138 **5 Claims**

1. In a cylinder and dial circular knitting machine for producing detachable strips of knitted fabric, the combination comprising a striping box; needle actuating camming at the striping box, and the striping box being selectively operable to feed yarn or draw thread to cylinder needles at the striping box associated camming; needle actuating cylinder and dial camming on each side of the striping box including adjustble cams movable between positions in which engaging needles are caused to perfom a knitting operation and positions in which needles are caused to weld; control means for positioning the adjustable cams, for causing the striping box to feed yarn when the adjustable cams are disposed to cause needles to perform a knitting operation, and for causing the striping box to feed draw thread when the adjustable cams are disposed to cause needles to welt; means for positively feeding yarns to needles at the adjustable cams and striping box when the positions of the adjustable cams is such as to cause needles to knit and the striping box is feeding yarn; and means for disengaging the yarns from the positive feed means when the



adjustable cams are moved to cause needles to welt and the striping box to feed draw thread.

4,033,151

LIQUID SEPARATION OF SOCK STRING

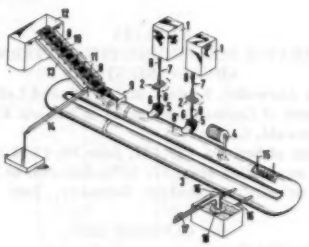
Josephus Johannes Maria Jansen, Schijndel, Netherlands, assignor to Koninklijke Textielfabrieken, Schijndel (N.B.), Netherlands

Filed May 19, 1975, Ser. No. 578,396

Claims priority, application Netherlands, May 21, 1974, 7406824

Int. Cl.² D04B *35/00*

U.S. Cl. 66—147 **5 Claims**

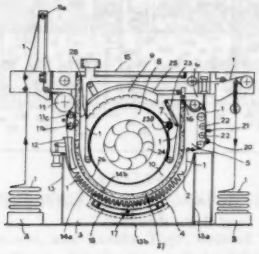


1. In apparatus for knitting socks comprising a circular knitting machine having a knitting cylinder on which socks can be knitted and courses of a soluble yarn can be knitted between the toe portion of each sock knit and the welt portion of each subsequently knit sock to produce a continuous string of such socks, and means for drawing the string of socks rotatingly downwardly out of the knitting cylinder, the improvement which comprises a conduit defining a closed flow course, a liquid in said conduit, means for circulating said liquid in said conduit, said conduit having entrance means through which said string of socks can be passed to introduce same into said liquid for dissolving said soluble yarn and thereby separating the socks one from another, and means communicating with said conduit for removing socks from said liquid.

4,033,152
APPARATUS FOR WASHING AND SUBSEQUENT DRYING OF BOLTS OF FABRICS

Bruno Marchesini, Trissino, and Fernando Martini, Piovene Rocchette, both of Italy, assignors to Rimar Meccanica S.p.A., Carpenedolo, Italy

Filed Mar. 3, 1976, Ser. No. 663,490
Claims priority, application Italy, Mar. 7, 1975, 21028/75
Int. Cl.² D06B *3/20, 21/02*
U.S. Cl. 68—19.1 **7 Claims**

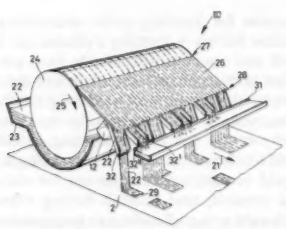


1. Apparatus for washing and subsequently drying bolts of fabrics, which comprises: means for continuously delivering a fabric; a fixed basket for receiving said fabric and having outer and inner walls substantially semicylindrical and coaxial to each other; said outer wall being partially perforated; agitating means positioned in juxtaposition with said perforations and having a plurality of mobile paddles thereon; a chamber defined in part by said outer wall and containing said agitating means, and having side walls and bottom wall and being defined by said side walls, said bottom wall and said outer wall; said chamber serving to contain a liquid solvent therein; a perforated, rotatable drum coaxially mounted with respect to said inner and outer walls of said basket and having a diameter smaller than the diameter of said inner wall; means for forcing hot air through said perforated drum in a closed fluid circuit; and guiding means to guide said fabric from said basket tangentially onto a portion of said perforated drum.

4,033,153
APPARATUS FOR PRODUCING PATTERNS ON ADVANCING STRIPS

Karl-Heinz Ahrweiler, Krefeld, and Ferdinand Leifeld, Tonisvorst, both of Germany, assignors to Eduard Küstes, Krefeld-Forstwald, Germany

Continuation of Ser. No. 483,431, June 26, 1974, abandoned.
This application Mar. 17, 1976, Ser. No. 667,482
Claims priority, application Germany, July 11, 1973, 2335234
Int. Cl.² D06B *1/04*
U.S. Cl. 68—205 R **20 Claims**



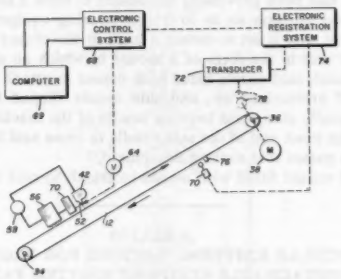
1. Apparatus for producing a pattern on a moving strip such as a textile web or the like comprising:

a. a trough located above the strip to be patterned containing therein a pattern producing liquid;
b. a roller supported above said trough for rotation therein to pick up on its surface said pattern producing liquid; and
c. means for scraping in contact with the circumference of said roller to scrape said pattern producing liquid thereoff, said means being inclined toward said strip; wherein the improvement comprises:
d. a catch pan;
e. a plurality of liquid conducting channels arranged side-by-side in close proximity across the width of said means for scraping;
f. a plurality of positioning means for moving said individual channels between a first position in which said channels direct the material flowing from said means for scraping to said catch pan and a second position wherein liquid is permitted to flow onto the strip and
g. said positioning means permitting individual, independent movement of said channels with respect to time as said moving strip moves therebelow, whereby different amounts of pattern producing liquid will be deposited on different areas of said strip with respect to time to cause a patterning thereof.

4,033,154
ELECTRONIC CONTROL SYSTEM FOR DYEING AND PRINTING MATERIALS

Harold L. Johnson, Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Continuation of Ser. No. 477,461, June 7, 1974, abandoned.
This application May 4, 1976, Ser. No. 683,224
Int. Cl.² D06B *1/02*
U.S. Cl. 68—205 R **25 Claims**



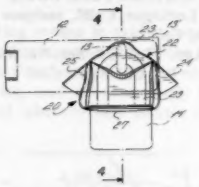
1. In apparatus for dyeing and printing textile material to form a pattern thereon including a conveyor for moving the textile material in a path of travel, a plurality of applicator means positioned along the conveyor, each said applicator means applying plural streams of liquid to the material during its passage thereby, means for storing pattern data, and means for periodically generating an enabling signal, the time between enabling signals being one cycle of operation, said storage means reading out said data in response to said enabling signal, the improvement comprising an electronic control system means for controlling said plural streams of liquid in accordance with the pattern data stored in said storage means, said electronic control system means comprising:

a. means for receiving during one cycle a block of pattern data from said storage means, said block including pattern data for each of said plurality of applicator means, said receiving means including a plurality of first output lines equal to said plurality of applicator means and means for routing said data to said first output lines;
b. a plurality of means, each having a first input connected to one of said first output lines and a plurality of second output lines equal to the number of said plural streams, for providing output signals on said second output lines

corresponding to said pattern data on said first output lines, the duration of said output signals extending for a predetermined time period; and

c. a plurality of means, each having a second input connected to one of said second output lines, for individually directing said plural streams of liquid from said applicator means in accordance with said output signals whereby a predetermined amount of liquid is applied to said material.

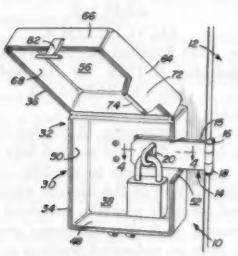
4,033,155
PADLOCK PROTECTING DEVICE
Jerry S. De Lucia, 1013 Revere Ave., Bronx, N.Y. 10465
Filed May 24, 1976, Ser. No. 689,654
Int. Cl.² E05B *67/38*
U.S. Cl. 70—56 **2 Claims**



1. A protecting device for use in combination with a padlock in securing first and second members wherein a hasp is secured to said first member and a staple is secured to said second member, comprising:

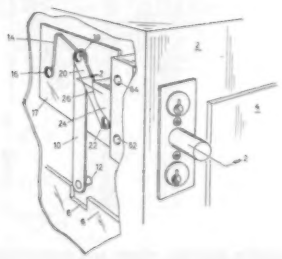
a hood-like member having dimensions suitable for containing said padlock and staple therein, said member containing a rear wall having a staple receiving slot adjacent a top thereof, said member having said top, front and first and second side walls, said front wall having a relatively perpendicular outwardly protruding lip at the bottom edge thereof and a depending further front wall from the front of the outwardly projecting lip and a cross-member extending from the inside rear wall beneath said staple receiving slot to the inside front wall interior of said protruding lip, said cross-member to abut the staple and be enclosed by said padlock.

4,033,156
COVER FOR PADLOCK
Michael H. Cottingham, 10222 Broadguage Road, Mechanicsburg, Ohio 43044
Filed Sept. 23, 1976, Ser. No. 725,706
Int. Cl.² E05B *67/38*
U.S. Cl. 70—56 **13 Claims**



1. An enclosure for enclosing the keeper for a hasp, the free swingable end of a hasp operatively associated with the hasp and a lock removably locking the free swingable end of the hasp over said keeper, said enclosure comprising a hollow housing having main and cover portions, said main portion including a base wall having inner and outer sides and adapted to have its outer surface abutted against a support to which the keeper for a hasp is to be secured, said base wall including peripheral walls extending about the peripheral edges thereof and projecting outwardly from the inner side thereof, said cover portion including an outer wall having outer and inner sides and peripheral walls extending about the peripheral edges thereof and projecting outwardly of the inner side thereof, the peripheral walls of said base and cover portions including pairs of corresponding side walls, hinge means hingedly securing the free edge portions of one pair of said corresponding side walls together for swinging movement of the cover portion relative to the base portion between an open position with said cover portion out of registry with the open side of said base portion and a closed position overlying and closing the open side of said base portion with the free edge portions of corresponding pairs of said side walls abutting each other, said base wall having a plurality of mounting apertures formed therethrough adapted to have the mounting apertures of the mounting plate of a hasp overlying the inner surface of said base wall registered therewith for securement of said mounting plate over the inner surface of said base wall and the latter to said support by means of fasteners secured through said registered apertures, a second pair of said corresponding side walls of said base and cover portions having a notch formed therein and an outwardly projecting tongue formed thereon, respectively, said notch including an inner extremity at least closely adjacent said base wall and disposed in a position aligned with a path extending between said apertures and the notched side wall, whereby said hasp may be swung into operative position over the mounting plate of said keeper through said notch, the outer free end of said tongue, when said cover is in said closed position being slightly spaced from said inner extremity, whereby said hasp may be received between said tongue free end and the inner extremity of said notch.

4,033,157
LOCKING MECHANISMS
John Williams, Georgetown, Canada, assignor to Canadian Business Machines Ltd., Mississauga, Canada
Filed Nov. 12, 1975, Ser. No. 631,219
Int. Cl.² E05B *65/46*
U.S. Cl. 70—85 **3 Claims**



1. A locking mechanism for locking the drawer of a cabinet or the like, of the type having latch means engagable with said drawer to prevent its opening and disengagable to allow its opening; said locking means comprising:

a housing adapted to be mounted on said cabinet and adjacent said drawer;

a bolt bore hole extending through said housing perpendicular to the front of said cabinet;

a locking bolt movable axially within said bolt bore hole and having a circumferential recess therein;

a pair of slots in said housing extending from opposite sides of said bolt bore hole normal to the axis thereof;

a locking pin in each of said slots, each said pin having a forwardly open notch therein, and being movable along

said slots into and out of a position of projection into said bolt bore hole and into said circumferential recess;

a pair of cylinder lock bore holes spaced from said bolt bore hole in the directions corresponding to said slots and extending parallel to said bolt bore hole to connect with said slots;

a cylinder lock in each of said cylinder lock bore holes having on the end thereof lugs projecting into said slots to engage said notches in said pins and operable in response to a key turned in said cylinder locks to move said pins in and out of said bolt bore hole;

one of said pins being urged towards said bolt by compression spring means mounted in its associated slot, and being movable away from said bolt against said spring means by operation of its respective cylinder lock;

the other of said pins being positionable to remain in an unlocked position removed from said bolt bore hole and a locked position projecting into said bolt bore hole in response to operation of its respective cylinder lock;

cam means on said bolt adapted to operate said latching means to engage or disengage same in response to axial movement of said bolt;

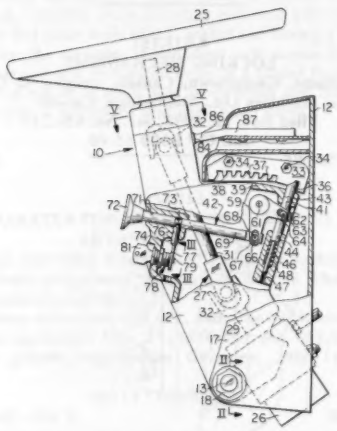
said recess of said bolt being positioned opposite said slots and adapted to receive said pins when said bolt is in the locking position.

4,033,158

ADJUSTABLE STEERING WHEEL AND TRANSMISSION LOCK ARRANGEMENT

Richard W. Chamberlain, and Michael E. Moore, both of Aurora, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 23, 1976, Ser. No. 660,559
Int. Cl.² B60R *25/06*
U.S. Cl. 70—202 **10 Claims**



1. An adjustable steering wheel and transmission lock arrangement comprising:

a supporting structure,

a transmission shift lever being shiftable between a forward speed position, a neutral position, and a reverse speed position;

a steering column pivotally fastened to the supporting structure, said transmission shift lever being fastened to one side of the steering column, said steering column being pivotal in a vertical direction between a plurality of operating positions at all positions of the transmission shift lever and to a transmission locking position when the transmission shift lever is in the neutral position;

a positioning member secured to the support structure and having a plurality of spaced notches formed therein with one of the notches representing the transmission locking position and the other notches each representing an operating position of the steering column;

latching means carried by the steering column and being operative independent of the transmission shift lever for engagement with said one of the notches for latching the steering column in the transmission locking position and for engagement with any of the other notches for latching the steering column in one of the operating positions; and

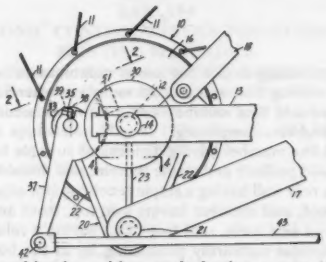
a transmission locking member secured to the support structure, said transmission locking member being positioned in the pathway of the transmission shift lever for abutment therewith when the steering column is in the transmission locking position for locking the transmission shift lever in the neutral position.

4,033,159

MOTORCYCLE LOCK

Bruce A. Bennett, Larkspur, Calif., assignor to Creative Innovations, Tiburon, Calif.

Filed Apr. 17, 1975, Ser. No. 568,977
Int. Cl.² B62H *5/00*
U.S. Cl. 70—233 **3 Claims**



1. In combination with a cycle having a rear axle and a frame member connected to said axle, a brake plate fixed relative to said axle, and a brake actuating lever swingably mounted on said plate, a lock for said cycle comprising:

a housing interposed on said axle between said frame member and said brake plate,

an extension integral with said lever and provided with a detent,

said housing being formed with an opening for receiving said extension therein,

a key actuated lock mounted in said housing and provided with a lock element adapted to engage said detent to prevent movement of said lever from brake actuating position.

4,033,160

BICYCLE LOCK

James J. Mima, 1351 Bluebell St., Oxnard, Calif. 93030

Filed Mar. 8, 1976, Ser. No. 664,919
Int. Cl.² B62H *5/00*
U.S. Cl. 70—233 **4 Claims**

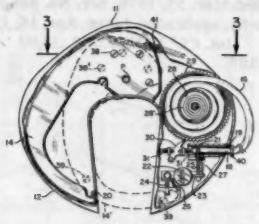
1. A bicycle lock comprising, in combination:

a. a housing having first and second legs extending downwardly in a given position to straddle opposite sides of a tire and rim portion of the bicycle wheel;

b. a C-shaped member pivotally mounted in an upper part of said housing such that the lower arm of the member can swing from an unlocked position in the lower end of said first leg of the housing into a locked position in the lower end of the second leg of the housing underneath said tire and rim of said bicycle wheel so that the tire and rim are wholly surrounded by the combination of the legs of the housing and the lower arm of the C-shaped member;

c. a cable coiled within said housing with one end extending

from a side of the housing such that the cable can be pulled from the housing and looped about a stationary object, said second leg of said housing having an entrance opening for receiving said one end of the cable; and



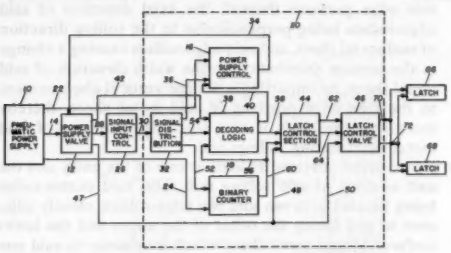
d. a single locking means in said second leg operable to separately or simultaneously lock the lower arm end of said C-shaped member and the one end of said cable in said second leg, and simultaneously unlock the same when operated whereby said bicycle is secured against theft.

4,033,161

FLUID CONTROLLED SECURITY LOCK

Michael J. Goes, 3256-B Picatinny Arsenal, Dover, N.J. 07801

Filed Mar. 1, 1976, Ser. No. 662,317
Int. Cl.² E05B 51/02
U.S. Cl. 70—275 **3 Claims**



1. A fluidic locking system for controlling access to a secured area which comprises:

means for providing pneumatic power to said fluidic locking system:

signal input control means, pneumatically connected to said means for providing pneumatic power, for generating a plurality of pneumatic output signals therefrom in response to mechanical stimuli;

fluidic logic control circuit means, pneumatically connected to said means for providing pneumatic power and to said signal input control means, for decoding said output signals received from said signal input control means and for generating a dud signal, a latch signal or an un-latch signal in response to said pneumatic output signals, which includes;

signal distribution means, pneumatically connected to said signal input control means, for routing pneumatic signals from said signal input control means to said fluidic logic control circuit means;

binary counter means having an input, pneumatically coupled to said means for providing pneumatic power and said signal distribution means, for monitoring the number of signals received from said signal input control means and for providing an output count signal equivalent to the number of signals received;

decoding logic means, pneumatically connected to the output of said means for providing pneumatic power, and signal distribution means and said binary counter means, for comparing the value of the pneumatic signals, routed thereto from said signal distribution means, with the output count signal delivered thereto from said binary counter means, and for providing either said output un-latch signal or said output dud signal to said fluidic locking system;

power supply control means, pneumatically coupled to said means for providing pneumatic power and signal distribution means and said decoding logic means, for controlling the operation of said means for providing power after said power supply control means receives a properly sequenced input signal from the output of said signal distribution means and said decoding logic means; and

latch control means, pneumatically connected to said means for providing pneumatic power, said binary counter means, and said decoding logic means, for providing a lock signal in response to said dud signal, said lock signal maintaining said fluidic locking system in a closed position and for providing said un-latch signal to operate said fluidic locking system so that access may be gained to said secured area; and

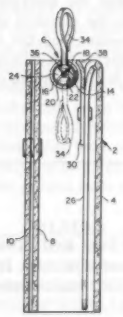
latch means, pneumatically coupled to said fluidic logic control circuit means and responsive thereto, for opening said fluidic locking system to said secured area in response to said un-latch signal and for maintaining said locking system in a closed state in response to said dud signal and in response to said latch signal.

4,033,162

KEY CASE HEAD

Giampiero Fontana, Milan, Italy, assignor to Buxton, Incorporated, Agawam, Mass.

Filed Nov. 10, 1975, Ser. No. 630,755
Claims priority, application Italy, Nov. 14, 1974, 29447/74
Int. Cl.² A47G 29/10
U.S. Cl. 70—456 B **4 Claims**



1. A key case head for releasably retaining a key ring having an enlarged head portion at one end thereof, the key case head comprising an inner stationary assembly having means for attachment to a key case including a shaft, a longitudinal portion extending parallel to and coextensive with said shaft, and disc means mounted on said shaft and longitudinal portion for receiving said enlarged head portion of said key ring therebetween, and a cylindrical portion disposed upon said inner stationary assembly and having a circumferential slot therein smaller in width than the diameter of said enlarged head portion, and an enlarged slot portion larger in diameter than said enlarged head portion, said key case head longitudinal portion obstructing movement of said enlarged head portion through said enlarged slot portion, said cylindrical portion being rotatable against a spring bias to a position in which said enlarged slot portion is clear of said longitudinal portion,

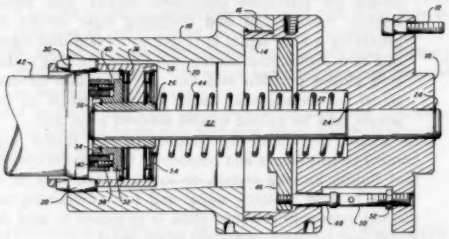
whereby to permit passage of said enlarged head portion through said enlarged slot portion.

4,033,163

APPARATUS FOR SWAGING TUBULAR MATERIAL

James R. Duffey, Yellow Springs, and Joseph W. Smith, Dayton, both of Ohio, assignors to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,486
Int. Cl.² B21D *41/04*
U.S. Cl. 72—121 8 Claims



1. A swaging tool for working the outside diameter of the end portion of a tubular workpiece including;

a mandrel sleeve having an internal tapered surface, and

a series of rollers mounted within the mandrel for contact with the outside surface of a workpiece inserted into the mandrel,

said rollers being axially movable relative to the tapered surface by the workpiece during operation of the tool, whereby relative rotational movement between the mandrel and the workpiece will produce rolling contact between the rollers and the workpiece, and relative axial movement between the mandrel and the workpiece will produce axial movement of the rollers relative to the mandrel, thereby forcing the rollers against the surface of the workpiece and decreasing the outside diameter of the workpiece.

4,033,164

METHOD FOR ROLLING TUBES

Horst Biller, Kettwig, and Friedrich Hüls, Mulheim, both of Germany, assignors to Mannesmannrohren-Werke AG, Dusseldorf, Germany

Filed Aug. 28, 1975, Ser. No. 608,671
Claims priority, application Germany, Aug. 29, 1974, 2441493
Int. Cl.² B21B *17/00*
U.S. Cl. 72—205 4 Claims

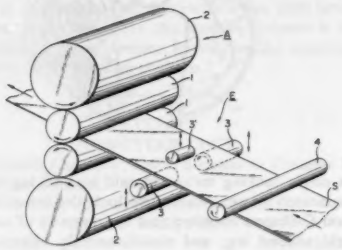
1. In a method of stretch-rolling tubular stock by means of a mill having a plurality of consecutively effective rolling locations and wherein the rolling speed in each location is reduced at least for the instant of engagement followed by raising of the speed, whereby the rolling speed of locations engaging the stock to be rolled earlier is reduced more than the speed of locations engaging the stock subsequently, and wherein normal operating speed of the rolls of the locations of the plurality is restored in steps and in dependence upon consecutive passage of the front of the stock through several of said locations, the improvement of causing the speed reductions to be proportional to the mean longitudinal tension in the stock during rolling.

4,033,165

APPARATUS FOR CONTROLLING FLATNESS OF METAL SHEET DURING ROLLING

Toru Arimura, and Fumio Fujita, both of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 15, 1976, Ser. No. 666,905
Claims priority, application Japan, Apr. 15, 1975, 50-44830
Int. Cl.² B21B *15/00, 39/08*
U.S. Cl. 72—205 18 Claims



1. An apparatus for controlling the flatness of a metal sheet during rolling, comprising:

two edge-rollers provided at least at one of the entry and the exit sections of rolling mill rolls, said edge-rollers being located symmetrically in the width direction of a metal sheet during rolling substantially in the horizontal direction, respectively closely adjacent to and facing one of the upper and the lower surfaces of said metal sheet at the side edge portions thereof, the axial direction of said edge-rollers being perpendicular to the rolling direction of said metal sheet, and said edge-rollers causing a change in the tension distribution in the width direction of said metal sheet, by imparting a desired vertical displacement to the side edge portions of said metal sheet, thereby increasing the draft at said side edge portions of said metal sheet during rolling; and

a center-roller provided at least at one of the entry and the exit sections of said rolling mill rolls, said center-roller being located between said two edge-rollers, closely adjacent to and facing the other of the upper and the lower surfaces of said metal sheet which is opposite to said one surface which is closely adjacent to and facing said edge-rollers, said center-roller being located at the width center portion of said metal sheet, the axial direction of said center-roller being perpendicular to the rolling direction of said metal sheet and horizontal, said center-roller being vertically movable, and said center-roller causing a change in the tension distribution in the width direction of said metal sheet, by imparting a desired vertical displacement to the width center portion of said metal sheet, thereby increasing the draft at said width center portion of said metal sheet during rolling.

4,033,166

SEQUENCING DIE AND METHOD FOR FORMING TRUSS WEBS FROM METAL TUBING

Arthur L. Troutner, Boise, Idaho, assignor to Trus Joist Corporation, Boise, Idaho

Filed Jan. 2, 1976, Ser. No. 646,043
Int. Cl.² B21D *28/06, 28/04, 28/26, 43/26*
U.S. Cl. 72—334 9 Claims

1. A method for forming truss joist webs with longitudinally opposed web ends from tubing comprising:

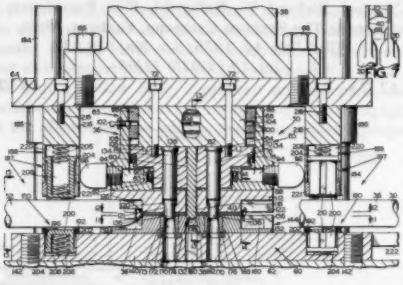
a. providing a length of tubing,

b. flattening the end portion of the tubing to form one of the flattened web ends, and

c. punching and shearing the flattened end portion without further flattening for forming a cross pin receiving hole and a terminal end portion,

d. advancing the tubing,

e. flattening the opposed end portion of the tubing for forming the opposed flattened web end, and



f. punching and shearing the opposed flattened end portion without further flattening for forming a cross pin receiving hole and a terminal end portion.

4,033,167

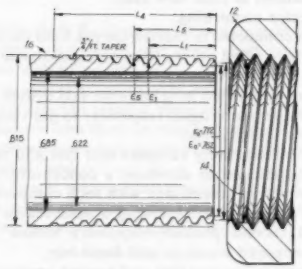
PROCESS FOR FORMING INTERMEDIATE METAL CONDUIT

Robert A. Philibert, Burlington, Conn., assignor to General Signal Corporation, New York, N.Y.

Continuation of Ser. No. 499,387, Aug. 21, 1974, abandoned. This application Mar. 5, 1976, Ser. No. 664,150

Int. Cl.² B21D *51/00;* **F16L** *15/00*

U.S. Cl. 72—367 **7 Claims**



1. A method of producing intermediate metal conduit, in accordance with National Electrical Code standards and in conventional trade sizes, such that fittings designed for a particular size of rigid metal conduit can be used interchangeably with a corresponding size of such intermediate metal conduit, comprising the steps of:

a. forming the intermediate metal conduit with a wall thickness which is approximately sixty per cent of the wall thickness for the corresponding size of rigid metal conduit;

b. forming the intermediate metal conduit with a nominal outside diameter which corresponds with the lower end in the wide tolerance range for the outside diameter of the corresponding size of rigid metal conduit;

c. maintaining, during the aforesaid forming steps, a narrow total tolerance of the order of 0.010 inches for the smaller sizes, and increasing to the order of 0.020 inches for the larger sizes, on the nominal outside diameter such that the minimum value for the outside diameter of the intermediate metal conduit corresponds substantially with the minimum value in the wide tolerance range for the outside diameter of the corresponding size of rigid metal conduit;

whereby, when an external thread of predetermined taper is provided on said intermediate metal conduit as formed, the normally resulting break-through of such conduit due to the thread is prevented, and threaded fittings designed for the corresponding size of rigid conduit are then compatible with and engage said external thread on said intermediate metal conduit.

4,033,168

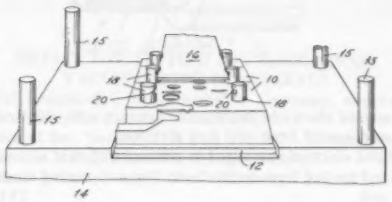
STRIP STOCK LIFTER

James C. Fisk, G-3219 E. Bristol, Burton, Mich. 48529

Filed Feb. 17, 1976, Ser. No. 658,387

Int. Cl.² B21J *13/08, 13/14*

U.S. Cl. 72—420 **21 Claims**



1. A stock lifter device for use in pairs and at opposite edge portions of strip stock for separating and supporting the strip stock out of engagement with the working face of a die member during performance of die operations upon said stock; said stock lifter device including:

an upright post stationarily mounted so that the upper end portion of the post is projectible into the lower end section of a bore in the die member that extends through the die member and opens out on the working face thereof;

a stock lifter body adapted to slidably fit the bore in the die member for endwise movement therein perpendicular to the working face of the die member, the upper end of the body having a side opening recess for receiving and supporting a marginal edge portion of the strip stock;

a helically coiled spring encircling the post and acting on the lower end portion of the stock lifter body to yieldingly project the upper end of the body outwardly of the working face of the die member; and

a pin and slot connection coupling the stock lifter body to the post and enabling the body to move under the influence of said coiled spring or in response to opposing die operating forces overcoming that of the spring, said pin and slot connection being located within the bare and so shaped as to restrain the stock lifter body against rotation about its axis while guided in its reciprocal motion within the die member.

4,033,169

HYDROCARBON CONCENTRATION SENSOR FOR USE IN ENGINE EXHAUST GAS

Takeshi Fujishiro, Yokohama, and Naomasa Sunano, Fukuchiyama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama and Shinyei Kaisha, Kobe, both of, Japan

Filed Aug. 7, 1975, Ser. No. 602,891

Claims priority, application Japan, Aug. 9, 1974, 49-91246

Int. Cl.² G01N *27/12*

U.S. Cl. 73—23 **8 Claims**

1. A sensor for sensing changes in the concentrations of unburned hydrocarbons in exhaust gas discharged from an internal combustion engine, comprising:

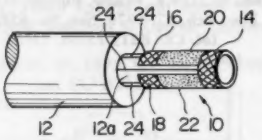
a support member of a dielectric and heat-resistant material;

a first layer of an *n*-type oxide semiconductor formed locally on a surface of said support member, the conductivity of said semiconductor increasing as the concentrations of the unburned hydrocarbons in the ambient atmosphere increase;

a second layer of a *p*-type oxide semiconductor formed on

said surface of said support member locally and spaced from said first layer, the conductivity of said *p*-type oxide semiconductor decreasing as the concentrations of the unburned hydrocarbons increase; both said first and second semiconductors having negative temperature coefficients of resistivity;

a first electrode arranged in contact with both of said first and second layers;



a second electrode arranged in contact with said first layer and spaced from said first electrode;

a third electrode arranged in contact with said second layer and spaced from both of said first and second electrodes; and

two resistors connected in series with each other; said first and second layers and said two resistors being electrically connected to construct a four-arm bridge.

4,033,170

APPARATUS FOR MOUNTING EXHAUST GAS SENSOR

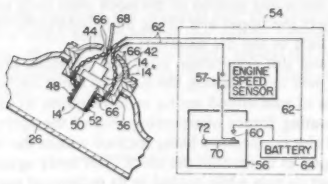
Yoshihisa Kawamura; Masaaki Saito, and Hidehiro Minami, all of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Oct. 29, 1975, Ser. No. 626,831

Claims priority, application Japan, Nov. 1, 1974, 49132673[U]; Dec. 29, 1974, 50-3432[U]

Int. Cl.² G01N *27/46*, *31/00*

U.S. Cl. 73—23 **15 Claims**



4. An engine system comprising:

an exhaust conduit through which exhaust gases issuing from the engine flow;

first means having a wall portion that forms a part of the exhaust conduit, the wall portion contacting with the exhaust gases;

an exhaust gas sensor secured to the wall portion with a probe portion exposed to the exhaust gases flowing through the exhaust conduit;

an insulator member covering the probe portion, the insulator member being provided with a plurality of apertures by which the probe portion is in flow communication with the exhaust gases;

a coiled heater surrounding the insulator member;

a pair of contact circuited in series with the coiled heater; and

means for closing the pair of contacts in response to a predetermined operating condition of the engine,

in which said first means includes a cap member covering a remaining portion of the exhaust gas sensor, the cap member and the wall portion cooperating to form a substantially closed member around the remaining portion of the exhaust gas sensor.

4,033,171

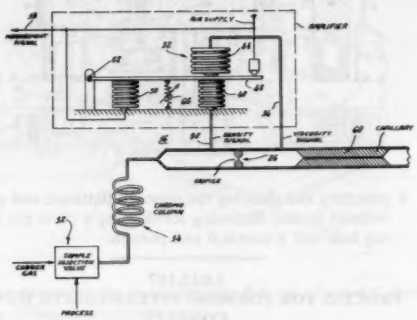
PNEUMATIC DETECTOR FOR CHROMATOGRAPHIC ANALYZER

Edwin L. Karas, Sharon, Mass.; Raymond Annino, Coldon, N.Y., and Richard W. Kalinoski, East Providence, R.I., assignors to The Foxboro Company, Foxboro, Mass.

Filed Feb. 14, 1975, Ser. No. 549,929

Int. Cl.² G01N *31/08*

U.S. Cl. 73—23.1 **6 Claims**



1. For use in a gas chromatograph including a separation column into which a sample mixture can be injected to be conducted through the column by a carrier gas so that the mixture components are physically separated to emerge from the column at different times;

a pneumatic detector for measuring the concentration of the separated components without significant error due to variations in fluid flow rate;

said detector comprising:

an orifice connected to receive the gas from the column and to produce a first pressure signal responsive to gas density and to gas flow velocity;

a capillary connected in series with said orifice to produce a second pressure signal responsive to gas viscosity and to gas flow velocity; and

means to subtractively compare said first and second pressure signals and to develope a concentration measurement signal in accordance with such comparison;

said comparison means includng a balanceable force bar;

first and second pressure-responsive means adapted to apply opposed forces to said force-bar;

means connecting said first and second pressure signals to said first and second pressure-responsive means respectively;

pneumatic means responsive to small movements of said force-bar and adapted to maintain said force-bar in balance;

said first and second pressure-responsive means being arranged to provide a force-effectiveness ratio different from unity so as to obtain effective cancellation of the flow-related elements of such signals, whereby said measurement signal is not significantly affected by variations in fluid flow rate.

4,033,172

APPARATUS FOR TESTING HOLLOW BODIES

Guy Flamand, Champforgeuil, France, assignor to Carnaud Total Interplastic, Chalon-sur-Saone, France

Filed Dec. 24, 1975, Ser. No. 644,034

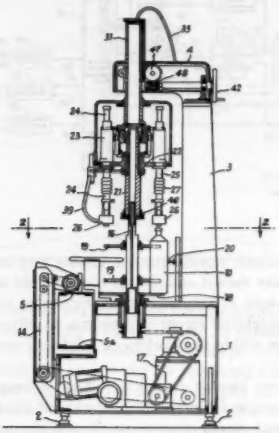
Claims priority, application France, Dec. 30, 1974, 74.43298

Int. Cl.² G01M *3/02*

U.S. Cl. 73—37 **9 Claims**

6. In an apparatus for testing hollow bodies moving along a conveyor and having a frame, a vertically extending drive shaft mounted at its lower end for rotation in said frame, a

support plate attached to the lower end of said drive shaft for rotation therewith at a location adjacent to said conveyor, means for successively moving hollow bodies from said conveyor onto said support plate for movement about said axis and for thereafter moving the hollow bodies from the support plate and back onto said conveyor, at least one testing head mounted on said drive shaft at a location spaced vertically above said support plate for rotation therewith in axial alignment with a hollow body supported on said plate and for simultaneous vertical movement into and out of engagement with the aligned hollow bodies, the improvement comprising:



a. a hollow shaft fixed to said frame against rotation and extending coaxially of said drive shaft into telescoping relation with its upper end;
b. bearing means coupling said drive shaft to said hollow shaft for rotation relative thereto;
c. a stationary cam fixed to said hollow shaft and having a cam surface extending around the axis of rotation of the drive shaft; and
d. cam follower means fixed to each of said testing heads and engaging said cam as the testing heads are rotated for effecting the vertical movement thereof.

4,033,173

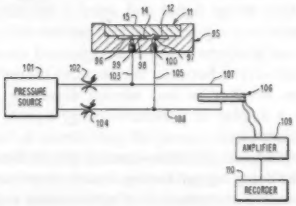
METHOD AND SYSTEM FOR SENSING AN IDENTIFYING MEANS

Asad Firdaus, Wappinger Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 535,263, Dec. 23, 1974, Pat. No. 3,962,903. This application Feb. 11, 1976, Ser. No. 657,126

Int. Cl.² G01B *13/00*

U.S. Cl. 73—37 **17 Claims**



1. A system for detecting the orientation of a semiconductor substrate having a metallic surface and a surface substantially parallel thereto with the substantially parallel surface having identifying means therein including:

receiving means to receive the semiconductor substrate in a temporary stationary position without damage to the metallized surface if the semiconductor substrate is disposed so that the metallized surface is in the position in which the parallel surface is to be disposed for detecting the orientation of the semiconductor substrate;

first means to indicate if the semiconductor substrate is disposed in said receiving means so that the metallized surface is not engaging said receiving means;

means to sense the location of the identifying means without contact with the surface of the semiconductor substrate;

and a second means to indicate the orientation of the semiconductor substrate by the location of the identifying means relative to said receiving means.

4,033,174

DEVICE FOR TESTING ANY LEAKAGE OF VACUUM-TIGHT GLASS SEALS

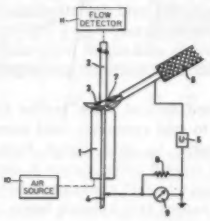
Helmut Samulowitz, Verlautenheide, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 489,372, July 17, 1974. This application Dec. 24, 1975, Ser. No. 644,067

Claims priority, application Germany, July 27, 1973, 2338192

Int. Cl.² G01M *3/16*

U.S. Cl. 73—40 **1 Claim**



1. A method of testing an open lamp envelope and an exhaust tube connected thereto which comprises:

testing for open fluid communication between said envelope and the end of the exhaust tube remote from said envelope by blowing a stream of gas through said envelope toward said exhaust tube and sensing flow out of said exhaust tube and

simultaneously testing for a leakage of said stream of gas at the juncture of said exhaust tube and said envelope by means of first and second electrodes disposed on opposite sides of said juncture, said electrodes being connected to a high voltage source to produce an electric breakdown through the glass seal in the event of leakage at said juncture, said first electrode being said stream of gas and said second electrode being a jet of burning gas from a burner.

4,033,175

GAS LEAKAGE MEASURING DEVICE

Takayuki Shiwaku, and Takeshi Miyazaki, both of Kure, Japan, assignors to Mitutoyo Manufacturing Co., Ltd., Tokyo, Japan

Filed May 11, 1976, Ser. No. 685,363

Claims priority, application Japan, Sept. 22, 1975, 50-114974

Int. Cl.² G01M *3/32*

U.S. Cl. 73—49.2 **3 Claims**

1. An apparatus for measuring gas leakage of a test specimen comprising:

a container having a gas inlet port and a gas outlet port, said outlet port being coupled to said test specimen;

a liquid container provided in said container;

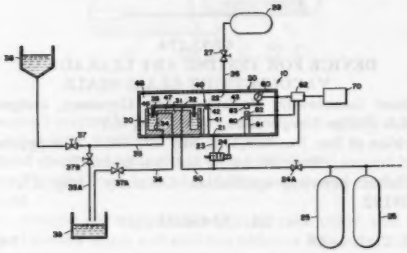
a balance mechanism provided in said container, said bal-

ance mechanism comprising a balance beam which is normally in an equilibrium position;

and inverted cup coupled to one end of said balance beam and floating in a liquid in said liquid container, said inside surface of said cup and the surface of said liquid defining a closed space;

a supply of reference gas coupled to said inlet port and to said closed space within said inverted cup via a first valve means;

a detector for detecting a deviation from said equilibrium position of said beam and for generating a signal corresponding to said deviation;



a means for measuring said deviation as a function of said signal from said detector;

means responsive to said signal from said detector for restoring said balance beam to said equilibrium position; and

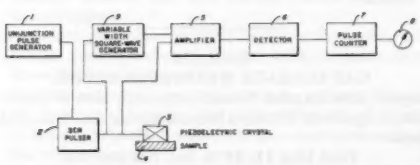
a normally closed second valve means for coupling said closed space to said container, said second valve means being responsive to said signal from said detector whereby said second valve means is actuated to couple said closed space to said container whenever said means for restoring causes said balance beam to return to said equilibrium position.

4,033,176

POCKET-SIZED, DIRECT-READING ULTRASONIC THICKNESS GAUGE

Frederick L. Eberle, Hammond, Ind., and Bernard Ostrofsky, Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 11, 1975, Ser. No. 595,060
Int. Cl.² G01N *29/00*
U.S. Cl. 73—67.9 **19 Claims**



1. A method for measuring the time between two or more sequential signals which comprises:

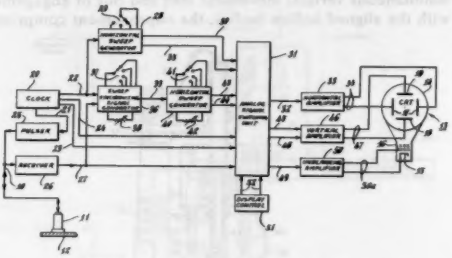
receiving two or more sequential signals; sending a response signal in response to the received signals; controlling the sending of the response signal by a variable-width square wave gate; adjusting the width of the variable square wave gate so that the response signal will be sent corresponding to a discrete number of received signals; and measuring the duration of the gate.

4,033,177

DUAL TRACE DISPLAY FOR ULTRASONIC TESTING APPARATUS

Dan Frank Case, Bethel, Conn., assignor to Automation Industries, Inc., Los Angeles, Calif.

Filed June 14, 1976, Ser. No. 696,139
Int. Cl.² G01N *29/04*
U.S. Cl. 73—67.9 **6 Claims**



1. An ultrasonic nondestructive testing instrument for use with transducer means adapted to transmit ultrasonic energy into a workpiece in response to an electrical signal and for deriving an electrical signal in response to ultrasonic energy reflected from within the workpiece, said instrument comprising:

a cathode-ray display device including an image-producing screen, means for projecting a beam of electrons toward said screen, beam-control means and means for deflecting said beam of electrons relative to said screen in first and second directions;

sweep means operative in synchronism with repetitive electrical pulses supplied to the transducer means for deriving a first sweep signal having repetitive components occurring during time intervals defined by alternate pairs of said repetitive pulses and a second sweep signal having repetitive components occurring during time intervals defined by remaining pairs of said repetitive pulses, said components of one of said sweep signals having a time rate of increase in amplitude different from that of said components of the other of said sweep signals;

means coupling said sweep means to said deflecting means for effecting deflection of said electron beam in said first direction relative to said screen;

means for supplying an electrical signal to said deflecting means for effecting deflection of said electron beam in said second direction relative to said screen in response to electrical signals from the transducer means;

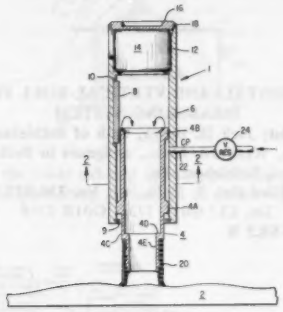
means coupled to said last-named means for deriving an offset signal in synchronism with said repetitive pulses having one amplitude during said repetitive components of said first sweep signal and another amplitude during said repetitive components of said second sweep signal to deflect said electron beam in said second direction relative to said screen between two sections thereof displaced from one another in said second direction thereby to produce a display of reflected-energy signals in each of said sections; and

means coupled to said beam-control means for deriving a trace-modifying signal having components representing said repetitive components of said second sweep signal, and occurring during said repetitive components of said first sweep signal thereby to modify a portion of the display of reflected-energy signals in one of said sections of said screen in relation to the time duration of the display in the other of said sections.

4,033,178
FLUID COUPLED TEST PROBE

Amos E. Holt, Lynchburg, and Ronald N. Roseveare, Evington, both of Va., assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Apr. 23, 1976, Ser. No. 680,014
Int. Cl.² G01N *29/00*
U.S. Cl. 73—71.5 US **8 Claims**

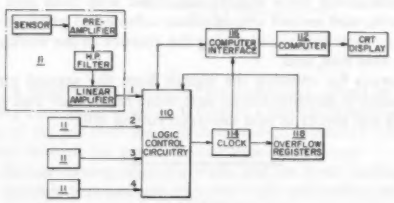


1. A fluid coupled test probe for the nondestructive testing of materials, comprising in combination, a cylinder having a closed end and an open end, a receptacle formed in said cylinder adjacent said closed end for receiving a transducer, a hollow piston having a head slidably engaging the wall of said cylinder and extending beyond the open end of said cylinder for engagement of the end thereof with the surface of a workpiece, and means for introducing a flow of couplant fluid under pressure into said cylinder between said closed end and said piston head through said hollow piston onto the surface of the workpiece to thereby obtain a solid column of couplant fluid between the transducer and the surface of the workpiece and to produce a force on said piston head positioning said piston in said cylinder forcing to maintain said piston end into engagement with the surface of the workpiece as said probe is moved relative to the workpiece.

4,033,179
ACOUSTIC EMISSION MONITORING SYSTEM

Delwin M. Romrell, Richland, Wash., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 7, 1975, Ser. No. 556,354
Int. Cl.² G01N *9/18*
U.S. Cl. 73—71.4 **19 Claims**



1. A method of monitoring the presence and source location of acoustic emissions generated within or on a tubular, acoustically conductive medium comprising the steps of:

monitoring acoustic emissions respectively at a plurality of at least three separate spaced locations around the girth of the tubular surface;

measuring the time difference between the first reception at one of the monitoring locations of a particular acoustic emission and the next reception of the same emission at a second of the monitoring locations;

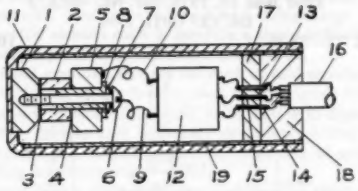
automatically blocking for a given period of time all further acoustic reception responses from the monitoring locations subsequent to the reception at the second monitoring location;

translating the time measurement into a position measurement around the tubular girth representative of the girth location most proximate the source of the emission; and registering the position measurement.

4,033,180
ULTRASONIC MICROPHONE FOR OPERATING WITH AN ACCUMULATED LAYER OF MUD OVER ITS VIBRATILE SURFACE WITHOUT CHANGE IN SENSITIVITY WITHIN ITS PRESCRIBED FREQUENCY RANGE

Frank Massa, Cohasset, Mass., assignor to Fred M. Dellorfano, Jr. and Donald P. Massa, Trustees of The Stoneleigh Trust u/d/t, Cohasset, Mass.

Filed Apr. 26, 1976, Ser. No. 680,425
Int. Cl.² H04R *7/00*
U.S. Cl. 73—71.5 US **6 Claims**

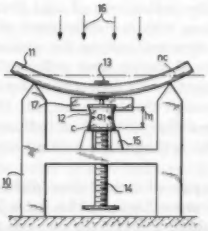


1. In combination in a microphone adapted for use in the measurement of ultrasonic sound signals transmitted in air in a dirty environment, such as when mounted underneath the body of an automobile, a vibratile element responsive to the presence of an ultrasonic sound signal whose pitch lies within a prescribed ultrasonic frequency band, said vibratile element including a diaphragm portion and an electroacoustic transducer portion, said vibratile element characterized in that the resonant frequency of said vibratile element lies above said prescribed ultrasonic frequency band, said vibratile element further characterized in that its diaphragm portion has a mass greater than 0.4 gram per sq. cm. of diaphragm area.

4,033,181
METHOD FOR DESTRUCTIONLESS PROOFING OF VISCOELASTIC PRODUCTS

Konrad Oeser, Hohr-Grenzhausen, Germany, assignor to Metzeler Gummitechnik GmbH, Edingen, Germany

Filed June 13, 1975, Ser. No. 605,249
Claims priority, application Germany, June 15, 1974, 2428992
Int. Cl.² G01N *21/00*
U.S. Cl. 73—88 A **11 Claims**



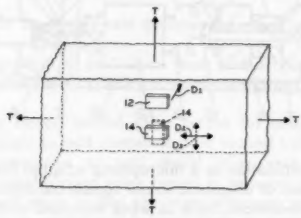
1. A method of forming holographic interferograms for the

non-destructive detection of inhomogeneities in bodies made of elastic and viscoelastic materials, including crankshafts, synthetic plastic components, rubber-metal structural components, and the like, the method comprising the steps of subjecting a test specimen at least part of which is made of viscoelastic material to a predetermined deformation, during the continuance of such deformation allowing the viscoelastic part of the test specimen to relax and creep, and during such relaxation and creeping forming the holographic interferogram by forming a first holographic photograph of at least part of the external surface of the test specimen at a first exposure moment and then after the elapse of a predetermined time interval and still during such relaxation and creeping forming at a second exposure moment a second holographic photograph superimposed upon the first.

4,033,182
METHOD FOR MEASURING BIAXIAL STRESS IN A BODY SUBJECTED TO STRESS INDUCING LOADS

Wayman N. Clotfelter, Huntsville, Ala., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed June 28, 1976, Ser. No. 700,673
Int. Cl.² G01L *1/00*
U.S. Cl. 73—88 R **10 Claims**



9. A method for determining the magnitude of biaxial stress in matallic test articles, comprising the steps of:

A. serially subjecting a specimen having characteristics similar to the characteristics of an article to be tested to a series of incrementally increased stress loads of known magnitudes, electronically establishing a transit time indication for the second wave echo for a longitudinal wave propagated through the specimen along a given path as the specimen is subjected to each load of the series for thus obtaining a first series of first transit time indications;

B. electronically establishing a transit time indication for the first wave echo for each of a pair of orthogonally related shear waves propagated along paths paralleling said given path through said specimen for vibrating particles of the crystalline lattice thereof in the planes of a first and a second orthogonally related stress axis extended through the specimen as the specimen is subjected to each stress load of the series of known stress loads for thus obtaining a second and a third series of transit time indications;

C. comparing the indications of said first series of transit time indications with the indications of said second and third transit time indications for obtaining a first and a second series of transit time differentials, and dividing each of the transit time differentials by the total length of the paths through the specimen, for thus establishing a series of time differential values indicative of stress magnitude for the orthogonally related stress axes for said specimen;

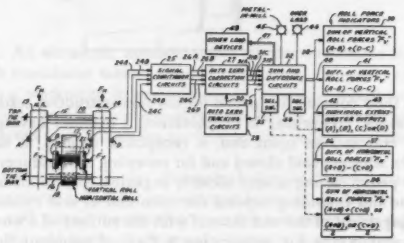
D. obtaining a pair of transit time differential indications between the second wave echo for a longitudinal wave propagated along a first path through a test article subjected to an unknown stress and the first wave echo for each shear wave of a pair of shear waves propagated along a second path extended through the test article paralleling said first path for vibrating the crystalline lattice thereof in the planes of a first and a second stress axis for said test specimen; and

E. comparing said pair of transit time differential values obtained for the test article to the series of time differential values established for the specimen for thus determining the magnitude of stress occurring along the first and second stress axes of the test article.

4,033,183
HORIZONTAL- AND VERTICAL-ROLL FORCE MEASURING SYSTEM

Harold A. List; Jack H. Baker, both of Bethlehem, Pa., and Jack Joyce, Westford, Mass., assignors to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Oct. 8, 1976, Ser. No. 730,927
Int. Cl.² G01L *1/22*; **G01B** *7/18*
U.S. Cl. 73—88.5 R **10 Claims**



1. Apparatus for measuring horizontal- and vertical-roll forces exerted on a workpiece in a universal rolling mill, comprising:

a. first, second, third and fourth extensometer means adapted to be mounted in pairs along a common neutral axis on opposing strain sites on first and second rolling mill posts, each said extensometer means having a separate output signal which varies proportional to the total strain at a given strain site as a function of horizontal-roll force, vertical-roll force and a zero drift component,

b. first circuit means responsive to a zero switching signal for automatically and independently zeroing each extensometer output signal to correct for the zero drift component associated with a given site,

c. second circuit means for resolving the four zeroed extensometer output signals into simultaneous horizontal- and vertical-roll force signals associated with both said mill posts, said second circuit means adapted to produce said zero switching signal during the absence of the workpiece in said mill, and

d. means for utilizing the signals from the second circuit means to simultaneously determine horizontal- and vertical-roll forces in said universal rolling mill.

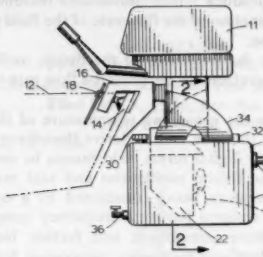
4,033,184
OUTBOARD MOTOR SERVICE TANK

Maurice O. Christink, 3966 Bloor St. West, Islington, Ontario, Canada

Filed Aug. 24, 1976, Ser. No. 717,239
Int. Cl.² G01M *15/00*
U.S. Cl. 73—117.1 **5 Claims**

1. A sevicing tank for outboard motors and the like comprising a tank compartment having an upper portion defining a suitable opening for admitting an outboard motor's propeller and gear, and having lugs for attaching to the motor; and having an inlet fitting for liquid admission; and having an

exhaust opening provided in a surface of the tank at a point lower than the inlet; the tank intended to contain cooling



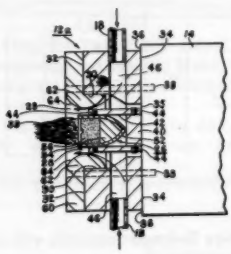
water; and the lower exhaust opening precluding backup into the inlet and permitting gas escape to reduce cavitation.

4,033,185

WIND-TUNNEL SIMULATOR

Thomas J. McNally, Levittown, Pa.; Sigfried Mehling, Emmelshausen, Hunsruck, Germany, and Walter J. Puchalski, Southampton, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 18, 1976, Ser. No. 687,577
Int. Cl.² G01M *9/00*
U.S. Cl. 73—147 **7 Claims**



1. A wind-tunnel simulator for producing, about an object having zero linear velocity, a flow of a gas which simulates the flow of the gas over the object as though the latter were projected through the gas, said simulator comprising:

a fixture having opposite walls and an inner surface that extends between said opposite walls and defines an opening for receiving said object therein spaced from said inner surface,

a said opening having opposite ends in said opposite walls, respectively,

conduit means formed in said fixture and communicating with said opening,

means to supply said flow of said gas through said conduit means, whereby to direct said gas over said object and through one of said ends of said opening,

motor means fixed to one of said walls of said fixture, and

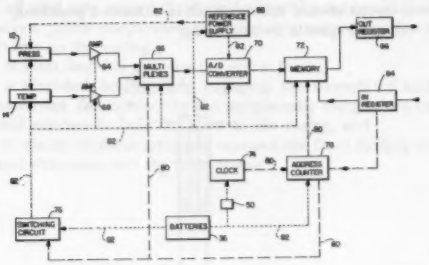
means coupled between said motor means and said object for spinning said object about an axis thereof.

4,033,186

METHOD AND APPARATUS FOR DOWN HOLE PRESSURE AND TEMPERATURE MEASUREMENT

Don Bresie, 8906 Little Walnut Parkway, Austin, Tex. 78758

Filed Aug. 6, 1976, Ser. No. 712,384
Int. Cl.² E21B *47/06*
U.S. Cl. 73—154 **24 Claims**



12. A down hole gauge apparatus for measuring and recording parametric conditions in an oil well, comprising:

parametric sensors each to produce a signal indicative of a selected parametric condition in said well;

individual amplifier devices for each of said signals;

a multiplexing device feeding each of said signals from said amplifier devices alternately to an analog to digital converter device, said converter device producing digital outputs each output representative of one of said alternating amplified sensor signals;

a storage device having a memory address for receiving and storing said digital output from said converter device;

an electrical power device to energize said apparatus;

an enclosure to enclosure said sensors, and said devices, said enclosure sealed from said well ambient environment, said sensors communicating with said well ambient environment.

4,033,187

WELL FLOW MEASURING APPARATUS

Yves Nicolas, Versailles, France, assignor to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 596,492, July 16, 1975, which is a continuation of Ser. No. 485,059, July 1, 1974, abandoned. This application Aug. 6, 1976, Ser. No. 712,402
Int. Cl.² E21B *47/10*
U.S. Cl. 73—155 **2 Claims**

1. A flow-measuring tool adapted for movement through a well bore and comprising:

a body having longitudinally-spaced upper and lower portions and adapted for suspension in a well bore;

at least three elongated bow springs circumferentially spaced in upright positions around said body with the mid-point of each of said bow springs being laterally disposed from an intermediately-situated location on said body;

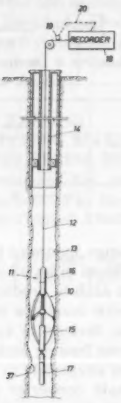
means pivotally securing a first end of each of said bow springs to a selected one of said body portions for limiting said first spring ends to only pivotal movement in relation to said one body portion as said spring mid-points respectively move between a laterally-extended position and retracted position adjacent to said intermediate body location;

means cooperatively intercoupling the second end of each of said bow springs for longitudinal movement together in relation to the other of said body portions;

means cooperatively arranged for maintaining said spring mid-points equidistant from said intermediate body location and including a coupling member slidably disposed on said body for longitudinal movement thereon between said first spring ends and said intermediate body location,

a corresponding number of rigid links pivotally interconnecting said coupling number of rigid links pivotally interconnecting said coupling member to about said midpoints of each of said bow springs, and biasing means normally urging said coupling member toward said intermediate body location for coordinating the lateral movements of said bow springs and for imposing a progressively-increasing lateral force thereon as said bow springs move toward their respective extended positions;

an axial spindle on said body;



flow-responsive spinner means including a plurality of spinner blades symmetrically arranged around said spindle, means respectively pivotally coupling the inboard ends of each of said spinner blades to said spindle for pivotal movement respectively between extended laterally-directed, flow-responsive positions and retracted positions lying generally along said spindle; and

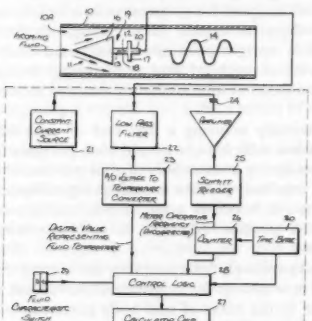
linkage means cooperatively coupled between said coupling member and said spinner blades for respectively moving said spinner blades between their said extended and retracted positions in accordance with movement of said coupling member along said body.

4,033,188

LINEAR VORTEX-TYPE FLOWMETER

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed May 30, 1975, Ser. No. 582,300
Int. Cl.² G01F 1/32
U.S. Cl. 73—194 VS **8 Claims**



1. A highly-accurate flowmeter for metering a fluid whose density and viscosity varies as a function of fluid temperature comprising:

A. a flow tube having means therein to intercept the fluid to be metered to produce fluidic oscillations therein whose frequency is a function of the flow rate of the fluid passing through the tube;

B. means to sense the frequency of the fluidic oscillations and to derive therefrom an uncorrected flow rate value in digital terms;

C. means to sense the prevailing temperature of the fluid passing through the tube and to derive therefrom a temperature value in digital terms, said means to sense the frequency of the fluidic oscillations and said means to sense the temperature being constituted by a common sensor yielding a signal having a frequency component and a temperature component and further including means to segregate said frequency component from said temperature component to provide said uncorrected flow rate digital value and said digital temperature value;

D. means to provide a fluid characteristics value in digital terms, depending on the relationship between the density and viscosity of said fluid and temperature; and

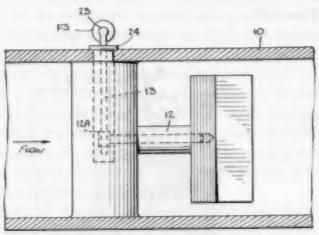
E. digital computer means responsive to said uncorrected flow rate digital value, said digital temperature value and said fluid characteristics digital value to produce a digital output signal which represents the flow rate corrected for the effect of temperature on the characteristics of the fluid.

4,033,189

EXTERNAL-SENSOR VORTEX-TYPE FLOWMETER

Peter J. Herzl, Morrisville, and Harold W. Metzger, Willow Grove, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Mar. 26, 1976, Ser. No. 670,998
Int. Cl.² G01F 1/32
U.S. Cl. 73—194 VS **8 Claims**



1. A vortex-type flowmeter operable with an external force sensor and comprising:

A. a flow tube through which a fluid to be metered is conducted;

B. an obstacle assembly disposed in said tube to create fluidic oscillations therein, said assembly being constituted by a fixed section mounted across the tube and a deflectable section cantilevered from the fixed section by a flexible beam whereby said deflectable section is excited into vibration by said fluidic oscillations at a frequency which is a function of flow rate; and

C. means to transmit the vibration from the deflectable section to a coupling head outside said tube which is engageable by a force sensor to generate a sensor signal whose amplitude depends on the force applied thereto and whose frequency is indicative of flow rate, said transmission means having a mechanical advantage effecting force amplification whereby said signal has a relatively high level, said vibration transmission means being constituted by a lever attached at one end to said coupling head and pivoted about fulcrum to cause said head to exert an

amplified force on said sensor, the vibrations of said deflectable section being applied to said lever at a point adjacent the other end thereof, said head being relatively close to said fulcrum.

4,033,190

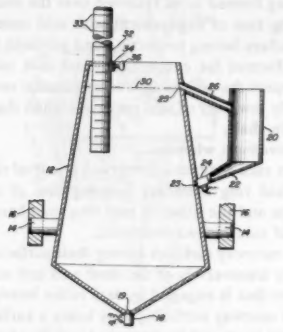
PRECISION MEASURING DEVICE

Henry S. Hudspeth, 12 Haley st., Pine Bluff, Ark. 71601

Filed Feb. 9, 1976, Ser. No. 656,698

Int. Cl.² G01F *19/00*

U.S. Cl. 73—426 **10 Claims**



1. A precision measuring device comprising; means for accurately measuring large volumes of liquid in gallon quantities including, a first open top liquid measuring vessel, means for storing and saving any excess liquid poured into said vessel which exceeds a predetermined designated amount, means for emptying said first liquid measuring vessel of the predetermined measured amount of liquid contained therein after filling, and the means for emptying said first liquid measuring vessel including means pivotally mounting the entire apparatus so that the predetermined measured liquid may be dumped from the first liquid measuring vessel.

4,033,191

INDICATING INSTRUMENT AND CASING

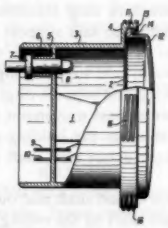
Alois Kreuz, Dornigheim, and Joachim Hahn, Oberursel, both of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Germany

Filed Sept. 11, 1975, Ser. No. 612,543

Claims priority, application Germany, Sept. 13, 1974, 2443867

Int. Cl.² G01D *11/24, 11/26*

U.S. Cl. 73—431 **10 Claims**



1. In an indicating instrument comprising a cup-shaped casing of plastics material, a measuring element within the casing, the measuring element including a display dial, the front end of the casing forming an extension of enlarged diameter interiorly threaded and being obturated by a window to form an observation aperture shield and being enveloped by a front frame provided on its back with a circular central recess which is larger than said observation aperture, the improvement comprising:

A. at least two circumferentially-spaced ribs in said recess each having an edge inclined with respect to the front surface of said frame,

B. at least two circumferentially-spaced ribs on and exteriorly of said extension, each having an edge inclined with respect to the front surface of said frame,

C. all said ribs conjointly forming matting wedge-shaped screw joints cooperating to releasably secure the front frame on the casing,

D. at least one end stop for the screw joints,

E. a threaded holding ring engaging the threads of said extension and contacting the peripherally-flanged rim of said window to hold the same to the casing, and

F. an elastic element arranged between the front surface of said extension and the front frame.

4,033,192

TEMPLATE FOLLOWING MECHANISM

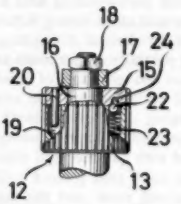
Hubert Junemann, Sudbrackstr. 68b, 48 Bielefeld, Germany

Filed Apr. 4, 1975, Ser. No. 544,630

Claims priority, application Germany, Jan. 28, 1974, 2403945

Int. Cl.² F16H *19/04*

U.S. Cl. 74—29 **1 Claim**

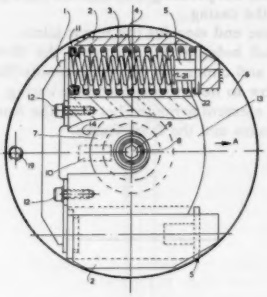


1. A template follower mechanism including a template consisting of at least a first gear rack, a second gear rack adjustably arranged in relation to said first gear rack, means for clamping together said racks after adjusting, a driven roller caused to bear against said template and comprising a driven first pinion capable of meshing with the teeth of said first gear rack and provided with a shaft journal, a second pinion coaxial with said first pinion capable of meshing with said second gear rack and pivoted on said shaft journal, and having bores therein fastening means for securing said second pinion against axial movements, means for arresting and resetting said second pinion in a normal position wherein the teeth of said second pinion are in alignment with the teeth of said first pinion, said means including bores in said second pinion continuously distributed on a pitch circle, said first pinion having bores coaxial with said bores in said second pinion, balls received in said bores of said first pinion, and springs within said bores for biasing said balls against the lateral edges of said bores in said second pinion, and stop means for limiting the rotary motion of said second pinion about one tooth pitch, one half in clockwise direction and one half in counterclock direction relative to the normal position, said stop means including a stop pin secured to said second pinion and extending into a bore located in said first pinion, said bore having an inside diameter permitting a rotary motion of said second pinion according to one tooth pitch.

4,033,193
VIBRATORY DRIVE UNIT

James Edward Brander, Strathfield, Australia, assignor to International Combustion Australia Limited, Australia

Filed Feb. 28, 1975, Ser. No. 554,218
Claims priority, application Australia, Mar. 4, 1974, 6795/74
Int. Cl.[2] F16H *33/00*
U.S. Cl. 74—61 1 Claim

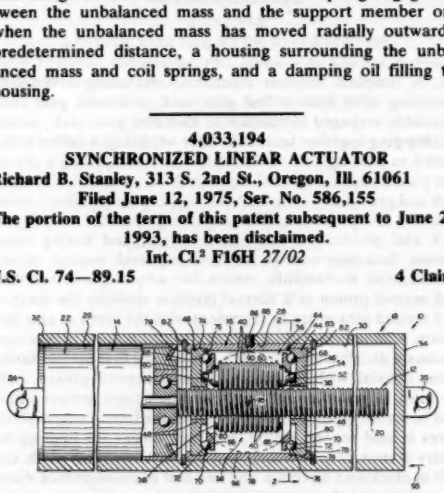


1. Rotary vibrator drive unit comprising a disc-like support member secured to a driven shaft for rotation therewith, an unbalanced mass slidably secured to the support member for outward radial movement under the influence of centrifugal force, said unbalanced mass being slotted with the slot enclosing the driven shaft, a bridging crossbar across the open end of the slot, a pair of spring housings secured to the support member in diametrically opposed parallel relationship, a first helical coil spring within each housing held between the crossbar and a flange at the end of its spring housing remote from the crossbar, each said first helical coil spring when the drive unit is stationary being partially compressed and urging the unbalanced mass toward the position of minimum unbalance, a second helical coil spring within and coaxial with each first coil spring and being of shorter length than the first coil spring, each said second coil spring being secured at one end to the crossbar and with its other end slidable over a spigot on said flange so that each said second coil spring engages between the unbalanced mass and the support member only when the unbalanced mass has moved radially outward a predetermined distance, a housing surrounding the unbalanced mass and coil springs, and a damping oil filling the housing.

4,033,194
SYNCHRONIZED LINEAR ACTUATOR

Richard B. Stanley, 313 S. 2nd St., Oregon, Ill. 61061

Filed June 12, 1975, Ser. No. 586,155
The portion of the term of this patent subsequent to June 29, 1993, has been disclaimed.
Int. Cl.[2] F16H *27/02*
U.S. Cl. 74—89.15 4 Claims



1. In a linear actuator including a threaded shaft, a linearly movable member to be moved linearly by the shaft and longitudinally of the shaft, a bearing unit operatively connected to said member and shaft for translating rotational movement of said shaft about its axis to linear movement of said member, and means for rotating the shaft about its axis, with said bearing unit comprising a plurality of discrete rollers having right flanges along their shanks spaced for rolling engagement with the shaft threading, said rollers at their ends defining bearing surfaces that are angled relative to their longitudinal axes, an outer race structure defining spaced apart raceway surfaces about the shaft axis about which said roller bearing surfaces respectively ride, and a roller support about which said rollers are received in free rolling nonjournaled relation thereto, said support being formed to be received over the shaft, said roller flanges being free of engagement with said outer race structure, said rollers having projecting end portions and said support being formed for cooperation with said roller end portions to support the rollers against substantial radial displacement radially inwardly of said raceways when the bearing unit is free of the shaft,

the improvement wherein:

said outer race structure comprises a pair of ring members,

one of said ring members forming one of said raceway surfaces and the other of said ring members forming the other of said raceway surfaces,

with said raceway surfaces having their surfacing of circular contour transversely of the shaft axis and across the area of same that is engaged by said roller bearing surfaces,

with said raceway surfacing area being a surface of revolution that is smoothly contoured axially of the shaft axis, and said roller bearing surfaces being free of gearing,

said raceway surfaces being respectively radially aligned with the respective roller bearing surfaces, and being coaxial with the shaft axis,

said support comprising a pair of spaced apart rings coaxial with the shaft axis through which said shaft is received and between which said outer race structure ring members are disposed,

said support rings on the sides of same facing the respective roller end portions defining keying recesses in which the respective roller end portions are received for keying said roller end portions to the respective support rings against movement of said rollers about said shaft relative to said support rings, respectively,

said roller end portions being free of journalling in their respective recesses,

said support ring recesses of the respective support rings being disposed in circumferentially spaced relation about said support rings and being circumferentially aligned at a predetermined radial level about the shaft axis,

said raceway surfaces being radially outward of but adjacent said radial level for maintaining said rollers in continuous rolling engagement with the shaft threading,

said outer race structure ring members being journalled between and relative to said support rings for free rotational movement of said outer race structure about the shaft axis relative to said support rings,

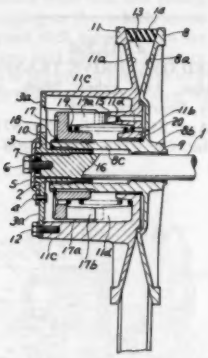
and means for making said support rings fast to said linearly movable member against movement relative to said linearly movable member for holding said rollers against orbiting movement about said shaft on rotation of said shaft,

whereby on rotation of said shaft said outer race structure is rotated about said shaft by the rolling engagement of said rollers with said shaft and said outer race structure, with said rollers being held by said support rings against orbiting movement about said shaft and said rolling engagement of said rollers with said shaft effecting linear movement of said bearing unit and the linearly movable member longitudinally of the shaft, whereby said bearing unit and the linearly movable member linear movement is synchronized with the lead of the shaft threading.

4,033,195
DRIVEN CLUTCH DEVICE FOR V-BELT TYPE AUTOMATIC TRANSMISSION

Izumi Takagi, and Masayuki Asazuma, both of Akashi, Japan, assignors to Kawasaki Heavy Industries, Ltd., Kobe, Japan

Filed Jan. 2, 1976, Ser. No. 646,028
Claims priority, application Japan, Jan. 13, 1975, 50-7443
Int. Cl.² F16H 7/02, 55/52
U.S. Cl. 74—230.17 M 1 Claim



1. A driven clutch device for a V-belt automatic transmission having a drive shaft supported in a single bearing means and a driving pulley mounted thereon with a symmetrical V-shaped groove therein and a stationary sheave on the driving shaft adjacent the bearing means and a movable sheave on the shaft on the opposite side of the stationary sheave from the bearing means and movable toward and away from the stationary sheave for varying the size of the V-shaped groove, a V-belt around said driving pulley in said V-shaped groove, and a driven shaft supported in a single bearing means, said driven clutch device comprising a stationary sheave around said driven shaft having a cylindrical part extending coaxially with said driven shaft toward the free end of the driven shaft, a coupling attached to said cylindrical part and closing the open end thereof and attached to the end of said driven shaft, a movable sheave slidably mounted on said driven shaft between the stationary sheave and the bearing means for movement along said driven shaft and defining a symmetrical V-shaped groove in which said V-belt is positioned, said movable sheave having a cylindrical extension coaxial with said driven shaft and extending slidably through said stationary sheave, a cam bracket on said cylindrical extension within said cylindrical part and having cam surfaces thereon facing said stationary sheave, said stationary sheave having contact parts thereon projecting toward and contacting said cam surfaces for moving said cam bracket away from said stationary sheave on relative rotation in one direction, and a torsion spring means between said cam bracket and said stationary sheave urging said stationary sheave and said cam bracket apart, whereby said movable sheave is urged toward said stationary sheave.

4,033,196
TIMING BELT TENSIONER

Yorishige Maeda, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed July 6, 1976, Ser. No. 702,579
Claims priority, application Japan, Nov. 26, 1975, 50-159922
Int. Cl.² F16H 7/12, 7/10
U.S. Cl. 74—242.11 R 5 Claims

1. A timing belt tensioner for an internal combustion engine comprising:

a base plate pivotally coupled to the front of said engine;

a first slot provided in said base plate;

a tensioner bearing holder disposed on said base plate over said slot;

a tensioner bearing means coupled to said bearing holder;

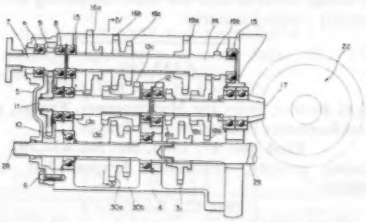
a second slot provided in said bearing holder over said first slot; and

a bolt means extending through said first and second slots for fixing the position of said timing belt tensioner on said engine; said first and second slots being shaped so as to permit the base plate and tensioner bearing holder to move relative to the bolt means extending through said first and second slots and along an arc having its center of curvature at the pivot axis.

4,033,197
TRANSMISSION FOR TRACTOR

Hajime Shikiya, Sennan; Seiichi Nakanishi, Sakai; Zitsuo Yoshida, Izumi, and Kenkichi Hirakawa, Sakai, all of Japan, assignors to Kuboto Tekko Kabushiki Kaisha, Osaka, Japan

Filed Apr. 8, 1975, Ser. No. 566,119
Int. Cl.² F16H 3/22, 3/30, 3/32, 57/02
U.S. Cl. 74—331 7 Claims



1. A transmission for a tractor comprising:

an input shaft (7) to receive power from a prime mover (1),

a first speed change shaft (11) spaced from and in parallel with the input shaft (7), the first speed change shaft (11) being adapted for operative connection to the input shaft (7) by means of removably mounted speed change gears (10, 9,)

a second speed change shaft (14) disposed coaxially with the input shaft (7), the second speed change shaft (14) being adapted for operative connection to the first speed change shaft (11) by means of speed change gears (16*a*, 16*b*, 16*c*), (13*a*, 13*b*, 13*c*),

a casing (4) having means defining openings to support the input shaft (7) and the first and second speed change shafts (11), (14) by means of bearings (8) respectively, the input shaft (7) and the second speed change shaft (14) being supported in the opening in spaced end-to-end relation, and

a covering (5) adapted to extend over a side wall of the casing (4),

and removably attached to the casing (4), the covering being provided with an outwardly extending deformed position serving to receive the terminal end portion of the first speed change shaft (11) and the gear (10) attached thereto, and to contain the input shaft (7) and its complemental speed change gear (9).

4,033,198

DEVICE FOR REDUCING NOISE IN GEAR WHEEL COUPLINGS, WITH A HIGH SAFETY DEGREE

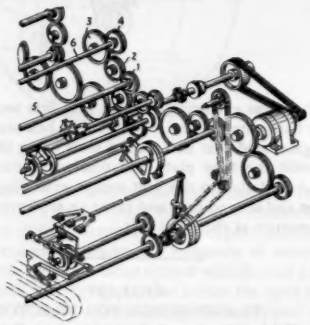
Enzo Seragnoli, Bologna, Italy, assignor to G. D. Societa per Azioni, Italy

Filed Jan. 29, 1976, Ser. No. 653,586

Claims priority, application Italy, Mar. 7, 1975, 3355/75

Int. Cl.² F16H *55/14, 55/00*

U.S. Cl. 74—443 **2 Claims**



1. A device for safely reducing noise produced in gear wheel couplings in motion transmission and distribution lines, particularly of wrapping and packeting machines operating at very high output speed, operatively connected to a gear wheel in such a line, comprising two gears coaxial and contiguous with one another and having identical numbers and angularly coincident arrangements of teeth, one of the gears consisting of rigid metal material and the other consisting of tough and elastically yielding material.

4,033,199

TOE CLIP FOR PEDALS

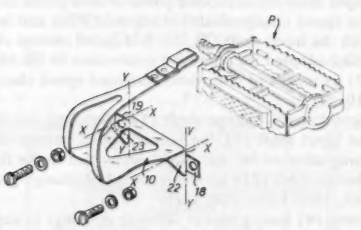
Paul C. Bouder, Soisy sur Montmorency, France, assignor to Etablissements Poutrait-Morin, France

Filed Nov. 17, 1975, Ser. No. 632,792

Claims priority, application France, Nov. 19, 1974, 74.38016

Int. Cl.² G05G *1/14*

U.S. Cl. 74—594.6 **9 Claims**



1. Toe clip for bicycle pedals or other similar pedals of the type including a pedal frame mounted for rotation about a spindle, the pedal frame having a pair of opposed longitudinal faces for supporting the rider's foot and a pair of opposed lateral faces, said toe clip comprising a toe supporting portion for supporting the fore end of the rider's foot, a turned back portion continuing beyond one end of said toe supporting portion and thereabove for defining a toe receiving space therewith, wherein the improvement comprises reinforcing gusset plate means downwardly depending from the lateral sides of said toe supporting portion and remote from said turned back portion, said gusset plate means being oriented substantially perpendicular to the toe supporting portion, and fastening lugs extending from said gusset plate means adapted to brought flush against at least one face of the pedal frame.

4,033,200

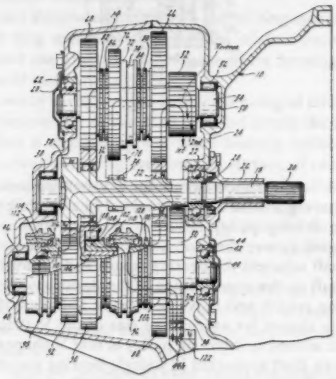
FIVE SPEED OVERDRIVE TRANSMISSION

Thomas R. Stockton, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 24, 1975, Ser. No. 571,337

Int. Cl.² F16H *37/00, 3/08*

U.S. Cl. 74—740 **4 Claims**



1. A power transmission mechanism having multiple speed ratios including an overdrive ratio comprising an input shaft, a pair of countershafts situated in parallel disposition with respect to said input shaft, multiple torque input gears on said input shaft, countershaft gear elements journalled on said countershafts in meshing engagement with said input gears, each countershaft being connected driveably to a countershaft output gear, an output gear assembly connected driveably to said countershaft output gears, synchronizer clutch means for driveably connecting selectively said gear elements with their respective counter shafts, an overdrive gear connected to said input shaft, an overdrive gear element journalled on one of said countershafts, an overdrive clutch means for connecting selectively said overdrive gear element to its associated countershaft, and overrunning clutch means for establishing a one-way driving connection between one of said countershaft gear elements and its associated countershaft whereby an upshift to the overdrive speed ratio may be accomplished while the synchronizer clutch assembly associated with said one countershaft gear element remains engaged.

4,033,201

OIL PRESSURE CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION SYSTEM

Ichio Sakai, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed June 13, 1975, Ser. No. 586,809

Claims priority, application Japan, Dec. 13, 1974, 49-143273

Int. Cl.² F16D *67/04;* **B60K** *41/10*

U.S. Cl. 74—869 **14 Claims**

1. An oil pressure control system for an automobile transmission system which includes a fluid torque converter, a

transmission gear and friction engaging means for establishing a selected transmission engagement in said transmission gear, comprising;

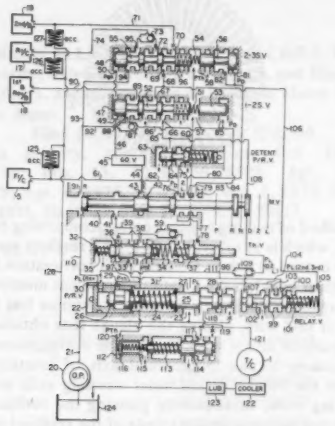
a source of oil pressure;

a line pressure regulating valve which generates a regulated line pressure from the oil pressure of said source;

a throttle pressure regulating valve which generates a throttle pressure from said line pressure, said throttle pressure increasing as the throttle valve is opened;

a governor pressure regulating valve which generates a governor pressure from said line pressure, said governor pressure increasing as the vehicle speed increases;

a plurality of speed shift valves which are shifted due to a balance between said governor pressure and said throttle pressure so as to supply oil pressure to a selected element or elements of said friction engaging means;



a manual shift valve which is operated by hand to supply oil pressure to a particular element or elements of said friction engaging means and apply a restriction to a selected one of said shift valves;

a torque converter pressure regulating valve which generates a torque converter pressure from said line pressure, said torque converter valve being supplied with said throttle pressure as a control pressure and generating a higher torque converter pressure in accordance with an increase in said throttle pressure;

a buffering accumulator for an element of said friction engaging means, said accumulator comprising a fluid displacement element and a back pressure chamber; and passage means to conduct said torque converter pressure to said back pressure chamber of said buffering accumulator.

4,033,202

SPEED RESPONSIVE ELECTRONIC CONTROLS FOR TRANSMISSIONS

Karl Gustav Ahlen, Stockholm, and Rolf Leonard Fabricius-Hansen, Alvsho, both of Sweden, assignors to S.R.M. Hydromekanik Aktiebolag, Sweden

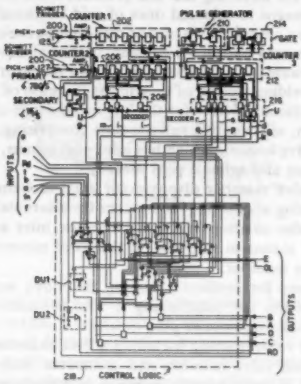
Filed Apr. 8, 1974, Ser. No. 459,179

Claims priority, application United Kingdom, Apr. 6, 1973, 16734/73

Int. Cl.² B60K *21/00*

U.S. Cl. 74—866 **7 Claims**

1. A remote control system for controlling the operation of a vehicle transmission including an input shaft operatively connected to a power source and an output shaft operatively connected to the vehicle drive wheels, comprising first sensing means for sensing the rotational speed of said input shaft and producing a first series of pulses in accordance therewith; second sensing means for sensing the rotational speed of said output shaft and producing a second series of pulses in accordance therewith; and control means for producing a control signal when the ratio of the frequencies of said first and second series of pulses is either above or below a selected value, said control means including first and second n-bit binary ring counters which are connected to said first and second sensing means, respectively, and which are fed respectively with the



first and second series of pulses, one of the counters directly controlling starting, stopping and return to zero of the other counter such that a signal representative of the actual value of said ratio is obtained in binary form; and a decoder means connected to said other counter for receiving said actual value signal, said control signal being derived from the output of the decoder means.

4,033,203

HYDRAULIC CONTROL SYSTEM FOR VEHICLE TRANSMISSION MEANS

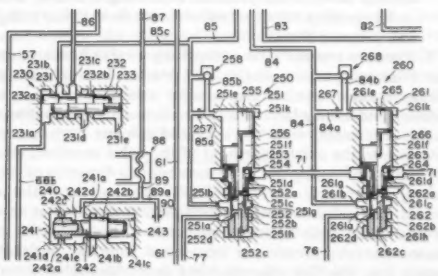
Koichiro Hirosawa, Kariya; Kazuo Ishikawa, Aichi; Tsunehiko Ogasawara, Kariya, and Noboru Murakami, Nagoya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Sept. 3, 1975, Ser. No. 610,074

Claims priority, application Japan, Sept. 17, 1974, 49-107274; Sept. 17, 1974, 49-107277

Int. Cl.² B60K *21/00*

U.S. Cl. 74—869 **7 Claims**



1. A hydraulic control system for vehicle transmission means including a gear transmission provided with a plurality of frictional devices adapted to be selectively and hydraulically actuated to provide a plurality of driving stages of different speed ratios including a low speed range and a high speed range, said hydraulic control system comprising:

a. a hydraulic pressure source to provide a supply of pressurized hydraulic fluid;

b. pressure regulator valve means connected with the hydraulic pressure source for receiving the pressurized fluid and providing a regulated line pressure, said pressure regulating valve means including a pressure increasing chamber means which, when subjected to a pressure, increases the line pressure regulated by the pressure regulator valve means;

c. shift valve means connected with the regulator valve means for directing the line pressure from the regulator valve means to selected ones of said frictional devices;

d. pressure control valve means disposed between said shift valve means and at least those frictional devices which are actuated in said low speed range of the transmission for providing a delay of time in the increase of pressure to the frictional devices for the low speed range of the transmission, said control valve means comprising:

1. a valve housing which has inlet port means, outlet port means and exhaust port means;
2. a valve member disposed for axial movement in said housing and having land means for alternately connecting the outlet port means with the inlet and exhaust port means in response to the axial movement of the valve member;
3. means for resiliently biasing the valve member in a direction for establishing a communication between the inlet and outlet port means;
4. said valve housing including a first chamber at an end of said valve member and connected with said outlet port means whereby pressure is introduced from the outlet port means into the first chamber, forcing the valve member against said resilient bias means;
5. a piston disposed in said valve housing for axial movement at the end of the valve member opposite said first chamber;
6. second resilient bias means for urging the piston in a direction opposite to the valve member;
7. a second chamber designed in the valve housing at an end of the piston opposite to the valve member; and
8. means for connecting said outlet port means through a restriction orifice means with the second chamber, said piston having a portion which is adapted, when pressure is established in said second chamber and the piston is displaced toward the valve member under the influence of the pressure in the second chamber, to engage the valve member to force it against the function of the pressure in the first chamber to establish the connection between the inlet and outlet port means, said inlet port means being connected with the pressure regulating valve means to receive the regulated line pressure therefrom, and said outlet port means being connected to said frictional device; and

e. means for feeding back the pressure from the pressure control valve to the pressure increasing chamber means in the pressure regulator valve means so as to increase the line pressure therefrom.

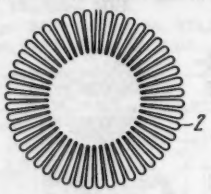
5. Pressure control valve comprising a valve housing which has inlet port means, outlet port means and exhaust port means, a valve member disposed for axial movement in said housing and having land means for alternately connecting the outlet port means with the inlet and exhaust port means in response to the axial movement of the valve member, means for resiliently biasing the valve member in a direction of establishing a communication between the inlet and the outlet port means, said valve housing including a first chamber at an end of said valve member and connected with said outlet port means whereby pressure is introduced from the outlet port means into the first chamber and force the valve member against the resilient bias means, a piston disposed in said valve housing for axial movement at the end of the valve member opposite to the first chamber, second resilient bias means for urging the piston in a direction opposite to the valve member, a second chamber defined in the valve housing at an end of the piston opposite to the valve member, and means for connecting said outlet port means through restriction orifice means with the second chamber, said piston having a portion which is adapted, when pressure is established in said second chamber and the piston is displaced toward the valve member under the influence of the pressure in the second chamber, to engage the valve member to force it against the function of the pressure in the first chamber to establish the connection between the inlet and outlet port means.

4,033,204

METHOD OF MAKING ROTARY CUTTERS

Viktor Samsonovich Salukvadze, 5 Parkovaya ulitsa 42, kv. 53, Moscow, U.S.S.R.

Filed Aug. 12, 1975, Ser. No. 604,075
Int. Cl.² B21K 5/12
U.S. Cl. 76—101 A **3 Claims**



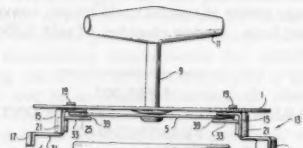
1. A method of making a rotary cutter, comprising corrugating a wire, which is to subsequently form a resilient member of the rotary cutter, to obtain a blank, each corrugation having a height at least equal to the length of a resilient member, adjacent corrugations being spaced apart a distance less than the diameter of said wire, placing the blanks thus obtained in an indexed position into a stack so that the corrugations extend perpendicularly to the longitudinal axis of rotation of the cutter and the blanks define outer working ends and inner non-working ends, subsequently pressing the resilient members, securing the non-working ends of the resilient members together and cutting off the outer ends of the resilient members to form the working surface of the cutter, the factor of filling of the working surface with said outer ends being within 0.05 to 0.7.

4,033,205

WRENCH FOR CONTAINER CLOSURES

Nathan D. Hoskins, 6 Maywood Drive, Jackson, Tenn. 38301

Filed June 4, 1976, Ser. No. 692,860
Int. Cl.² B67B 7/18
U.S. Cl. 81—3.42 **9 Claims**



1. In a wrench for container closures, comprising a supporting plate, an operating plate parallel to and disposed on one side of said supporting plate, a shaft passing rotatably through said supporting plate and fixed to said operating plate, a handle on said shaft on the side of said supporting plate opposite said operating plate, and a pair of opposed grippers that slide toward and away from each other on the side of said supporting plate opposite said handle and that engage slidably in arcuate slots in said operating plate whereby rotation of said handle moves said grippers toward and away from each other; the improvement in which said grippers are of two-part sheet

metal construction, with the parts of each gripper being fixedly secured to each other one on one side of said operating plate between said operating plate and said supporting plate and the other on the side of said operating plate opposite said supporting plate, said grippers being of stepped construction having gripping surfaces extending generally parallel to the axis of the shaft and spaced at different radial distances from the axis of the shaft thereby to grip container closures of different diameters.

4,033,206

NUMERICALLY CONTROLLED MACHINE TOOL

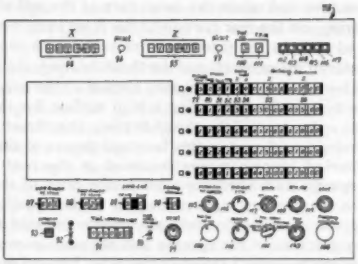
Eiichi Morita; Akira Toda; Toru Kobayashi, and Hiroshi Fujii, all of Ikeda, Japan, assignors to Daihatsu Motor Co., Ltd., Osaka, Japan

Filed July 8, 1975, Ser. No. 593,969

Claims priority, application Japan, Oct. 19, 1974, 49-120670; Feb. 13, 1975, 50-18598; Apr. 3, 1975, 50-40879; Apr. 4, 1975, 50-41410; May 1, 1975, 50-53624; June 9, 1975, 50-69929; July 11, 1974, 49-79817

Int. Cl.² B23B *3/00*

U.S. Cl. 82—2 B **5 Claims**



1. In a machine tool apparatus having a machine base, a drive shaft mounted on said base, a chuck operatively mounted on said drive shaft, means for driving said drive shaft, a bed mounted on the top of the base, slide table means operatively associated with the bed for longitudinally sliding movement relative thereto, means to move said slide table means in a longitudinal direction, cross-slide means mounted on said slide table means for transversely sliding movement relative thereto, means to move said cross-slide means in a transverse direction, tool rest means revolvably mounted on said cross-slide means, tool rest clamp lever means for locking said tool rest means to said cross-slide means, longitudinally positioned detector means operatively associated with said slide table means, and a transverse position detector means operatively associated with said cross-slide means, the improvement of a control unit operatively associated with said machine tool apparatus for operating same automatically, said control unit comprising electric circuit means corresponding to a mastern pattern for forming working mode patterns for a cutting tool in the longitudinal direction and the transverse direction respectively, means forming each working mode pattern of a cutting tool carried by the tool rest means into a fixed movement cycle, digital switch means for selecting and pre-setting each working mode pattern of the cutting tool, means actuated by each of said digital switch means for driving the slide table means and the cross-slide means in accordance with the master pattern to permit the cutting tool to achieve the desired machining.

4,033,207

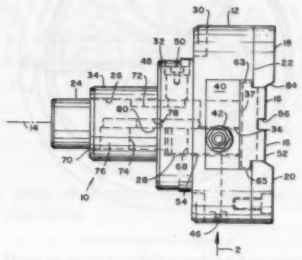
GENERATING HEAD STRUCTURE

Bruce G. Peuterbaugh, Mount Clemens, Mich., assignor to J. P. Tool, Inc., Warren, Mich.

Filed Dec. 3, 1975, Ser. No. 637,300

Int. Cl.² B23B *29/034*

U.S. Cl. 82—2 E **5 Claims**



1. Generating head structure comprising a housing having an axis of rotation, a bore through said housing on the axis of rotation thereof, a slot extending transversely of one end of the bore radially enlarging the bore in one transverse direction, a slideway channel for receiving a slide over one end of the bore in the housing extending in the one transverse direction, a slide positioned over the one end of the bore in the channel having guide flanges on the opposite sides thereof extending in the direction of the channel, said slide further including a rectangular portion extending in the direction of the bore and in the direction of the slot across the one end of the bore and offset to one side of the axis, an opening through the rectangular portion of the slide adjacent the inner end of the slot across the one end of the bore, and means for securing a cutting tool to the slide on the surface thereof away from the one end of the bore, circular segment keeper plates secured to the one end of the housing having a straight side, which plates are removably connected to the one end of the housing and which straight side extends over the channel in the housing for securing the slide within the housing for transverse movement relative to the bore through the housing in the channel, a drawbar extending into the housing through the other end of the bore, the inner end of which has a circular segment cross section limited to the other side of the axis of the housing from the rectangular portion of the slide, which drawbar includes a flat face adjacent the axis having a cam channel extending diagonally of the drawbar and bore therein adjacent the rectangular portion of the slide, and a cam key including a cylindrical portion positioned within the opening through the rectangular portion of the slide and a rectangular portion positioned within the diagonal cam channel in the drawbar wherein on axial movement of the drawbar into and out of the other end of the bore in the housing the rectangular portion of the cam key is caused to move in the cam channel of the drawbar to produce movement of the slide transversely of the one end of the bore in the body member through the cam key.

4,033,208

FACING TOOL

Guy T. Gilmore, Crosby, Tex., assignor to Multi-Fab, Inc., Houston, Tex.

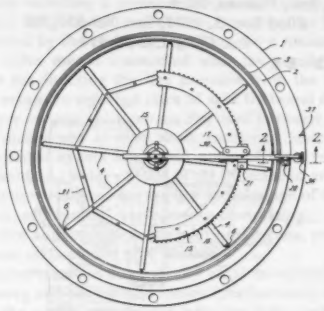
Filed Nov. 6, 1975, Ser. No. 629,641

Int. Cl.² B23B *5/16*

U.S. Cl. 82—4 C **6 Claims**

1. A cutting tool for facing or grooving flanges on tubular material, an anchoring means movable against the inside wall of a tubular member, a hub axially mounted in said anchoring means, means for controlled rotation of said hub, a boom mounted on said hub and having one end extended radially therefrom, a plurality of interchangeable templates of varied diameters, one of which is coaxially mounted on said anchor-

ing means, a link chain mounted on the periphery of said template, driving means mounted on said boom and confined



to said template and having a driving gear to mesh with said chain adapted to rotate said boom, cutting means mounted on the extended end of said boom.

4,033,209

SUPPORT ROLLS FOR SUPPORTING WHEELS OF A WHEEL SET DURING REPROFILING

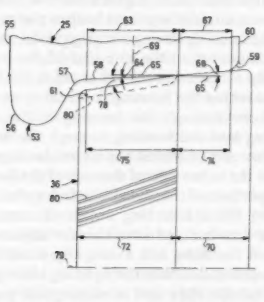
Theodor Dombrowski, Erkelenz, Germany, assignor to Wilhelm Hegenscheidt GmbH, Erkelenz, Germany

Filed Apr. 19, 1976, Ser. No. 677,883

Claims priority, application Germany, Apr. 22, 1975, 2517755

Int. Cl.² B23B *5/28*

U.S. Cl. 82—8 **11 Claims**



1. In an underfloor turning machine for remachining worn wheel profiles of a wheel set in a continuous operation, in which each wheel has a wheel rim at an inner end thereof, a combination comprising a pair of rolls for supporting each wheel of said set, the rolls of each pair of rolls being arranged spaced from each other substantially in a plane normal to the axis of the wheel set; and a turning tool for machining the profile of each wheel arranged between the rolls of each pair of rolls, each roll having a peripheral surface provided with an axially extending carrying zone and an axially extending transfer zone following the carrying zone in a direction toward a center plane of the wheel set and being inclined with respect to a horizontal line through an angle greater than the inclination of the desired profile to be machined into a portion of the wheel opposite said transfer zone, wherein the angle included between the transfer zone and a horizontal line is such that the radial distance between a point at an axial end of an active surface portion of the transfer zone facing the rim of the wheel in a plane including the wheel set axis and the roll axis from the opposite point of the desired wheel profile in said plane is equal to the maximum depth of a cut produced by the turning tool during one revolution of the wheel.

4,033,210

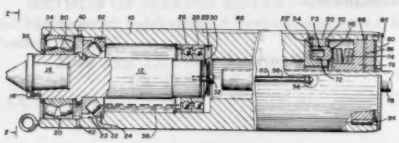
LIVE CENTER WITH HYDRAULIC PRESSURE INDICATOR

Henry F. Swenson, Roseland, N.J., assignor to J & S Tool Company, Inc., Livingston, N.J.

Filed Oct. 15, 1976, Ser. No. 732,806

Int. Cl.² B23B *23/04*

U.S. Cl. 82—31 **10 Claims**



1. A heavy-duty live center for lathes, grinders and like machine tools in which the work load is in excess of 10 tons and includes visual means for indicating the thrust on the live center, said center including: (a) a hollow quill; (b) a rotatable spindle carried in this quill, the quill in mounted condition having a work load supporting and extending beyond the quill and with the intermediate portion of the spindle sized so as to provide sufficient clearance between the bore and spindle for the spindle to bow withe the application of a heavy load and when bowed the spindle turns freely in the quill; (c) a self-aligning roller bearing mounted on the foreportion of the spindle and adjacent thereto and to the rear thereof is a self-aligning spherical roller thrust bearing; (d) a front bore formed in this quill, the front portion of this bore precisely sized to receive and retain the outer race of the self-aligning roller bearing and the rear portion of this front bore is made a determined amount oversized in its diameter with regard to the diameter of the outer race of the thrust bearing, the rear of this front bore having a face surface normal to the axis of the bore, this face surface providing a stop surface for the rear face of the outer race of the thrust bearing, this thrust on the bearing being transferred to this face and thence to the quill; (e) antifriction bearing means mounted on the rear of the rotating spindle and when mounted in the bore of the quill adapted to receive and support the rear of the spindle; (f) a biasing means in association with the spindle and said bearing means on the rear of the spindle and adapted to provide a preload to the bearings carried in the front bore of the quill, (g) a shoulder provided on the fore-portion of the spindle, this shoulder adapted to engage the inner race of the self-aligning bearing and as urged by the applied preload to this spindle the bearing is drawn rearwardly and as this bearing is moved rearwardly its inner race moves the inner race of the self-aligning spherical roller thrust bearing rearwardly to cause the outer race of said thrust bearing to be brought into sliding engagement with the inner rear face surface of the front bore; (h) sealing means in association with the spindle and front bore of the quill to close the front bore to dirt, coolant and the like to retain a lubricant in the bearings without contamination and when a heavy load is placed on the extending end of the spindle, the spindle is bowed in accordance with the load and the stiffness of the spindle, the self-aligning bearing moving into alignment with the bowing of the spindle and the outer race of the thrust bearing is moved in the enlarged bore an amount equal to the bowing of the spindle at the inner race of the thrust bearing; (i) a hydraulic load cell carried by and in the rear portion of the quill and including a recess ring portion and a piston portion carried by and in this recess in a fluid tight manner, one member portion carried in a fixed condition by and in the quill and the other movable member slidably carried by the fixed member; (j) a nut-like member slidably carried in the quill and adapted to mate with and engage a threaded screw as carried by a tailstock of the machine tool; (k) a heavy-duty spring-like overtravel member carried by the nut-like member and interposed between this spring and the slidable mating member of the hydraulic load cell, and (l) a hydraulic conductor leading from the hydraulic load cell to

and connected to a hydraulic gage secured to the quill, the hydraulic gage indicating the pressure in the load cell as the work load is mounted and expands under working conditions, the spring-like overtravel member providing the needed bias to limit the movement of the quill under the increased thrust to a determined limit of travel.

4,033,211

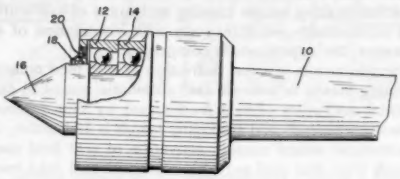
REPLACEABLE FLINGER FOR LIVE CENTERS

Henry F. Swenson, Roseland, N.J., assignor to J & S Tool Company, Inc., Livingston, N.J.

Filed Aug. 19, 1976, Ser. No. 715,868

Int. Cl.² B23B *23/04*

U.S. Cl. 82—33 R **3 Claims**



1. In combination a replaceable flinger removably mounted on the revolving center member of a live center and a grease seal removably mounted in a fixed spindle housing and with the lip portion of the seal adapted to rest upon a land portion of the flinger as and when mounted on the revolving center member, said flinger including: (a) a metal ring-like member sized to be a press fit on the revolving center member adjacent a front bearing by which the revolving center member is carried and toward a load carrying end of the center member and providing therewith a finished outer surface substantially parallel with the axis of the live center this land portion sized to receive an engaging lip of the replaceable grease seal, said flinger having a front shoulder portion which extends outwardly beyond said outer land portion providing a protection to the lip portion of the grease seal from chips and the like, said flinger further having a rearwardly and outwardly angled portion formed to provide a recess into which the lip portion of the grease seal extends to provide further protection to the lip portion of the grease seal as the live center members support a work piece being machined, the flinger and grease seal being replaceable and replaced without further disassembly when wear of the seal lip of the finished land of the flinger occurs and leakage past this seal lip portion is potentially present.

4,033,212

METHOD OF AND DEVICE FOR SEVERING A VENEER SHEET

Katsuji Hasegawa, Nagoya, Japan, assignor to Meinan Machinery Works, Inc., Ohbu, Japan

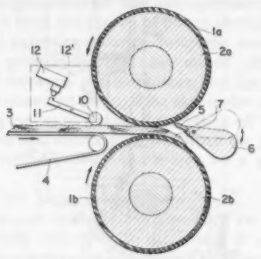
Filed Feb. 3, 1975, Ser. No. 546,605

Claims priority, application Japan, Sept. 19, 1974, 49-108114

Int. Cl.² B26D *5/06, 1/34*

U.S. Cl. 83—13 **14 Claims**

1. A method of severing a veneer sheet, comprising the steps of feeding a veneer sheet using a feeding means including a pair of members adapted to hold a veneer sheet therebetween, said feeding means being continuously driven to cause continuous feeding movement of said sheet between said members toward a cutter element, sensing a dimensional condition of said veneer sheet, and swingably displacing said cutter element transversely across the sheet in accordance with the sensing of said condition of the veneer sheet for cutting the veneer sheet due to the continuous feeding movement of the sheet toward the cutting element during the swinging thereof, said cutter element effecting cutting of the veneer sheet in each of the pivotal movements of the cutter element



which are made alternatelty in the clockwise and counterclockwise directions.

4,033,213

METHOD OF AND DEVICE FOR CUTTING BLOCKS OF FOAMED MATERIAL

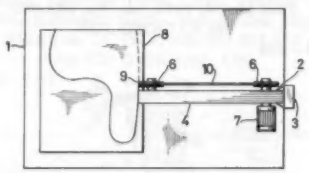
Gunter Eiselt, and Rudolf Hossbach, both of Unkel, Germany, assignors to Gunter Eiselt, Unkel, Germany

Filed Jan. 2, 1975, Ser. No. 537,964

Claims priority, application Germany, Jan. 3, 1974, 2400204; Feb. 6, 1974, 2405554; Sept. 4, 1974, 2442353

Int. Cl.² B26D *1/46*

U.S. Cl. 83—56 **1 Claim**



1. A method of efficiently clean cutting blocks of foamed synthetic material along short radii which includes in combination the steps of: tensioning at a force of from 5 to 30 kg an endless cable of elastic wear resistant material having a rough surface and a diameter within the range of from 0.5 to 2 mm, driving said cable at a speed of rotation within the range of from 30 to 60 m per second, and moving the foamed material to be cut relatively toward said cable and along a plane extending in a direction transverse to the direction of movement of said cable simultaneously during said tensioning and driving thereof for cutting blocks of foamed synthetic material.

4,033,214

BLADE SHARPENER

David Raymond Pearl, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., East Hartford, Conn.

Continuation-in-part of Ser. No. 398,255, Sept. 17, 1973, Pat. No. 3,955,458. This application Jan. 12, 1976, Ser. No. 648,540

Int. Cl.² B24B *3/36;* **B26D** *7/12*

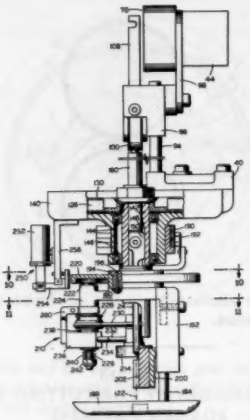
U.S. Cl. 83—174 **19 Claims**

1. A blade sharpener for a cutting apparatus with a cutting blade having a cutting edge and a blade support rotated by an orientation drive motor about an axis perpendicular to a work supporting planar surface to orient the blade in a cutting operation in a selected cutting direction comprising:

a sharpening wheel suspended from the blade support and adjacent the cutting edge of the blade for rotation about the perpendicular axis with the blade; and

drive means having an output member connected with the

sharpening wheel and selectively engageable with the orientation drive motor which orients the blade to rotate



the output member and drive the wheel about the wheel axis in conjunction with the rotation of the blade and blade support about the perpendicular axis.

4,033,215

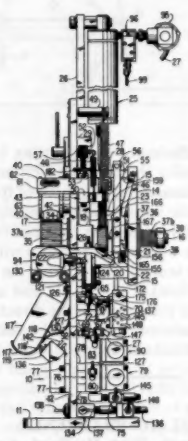
APPARATUS FOR CUTTING STRIPS OF MATERIAL

Volker Schmidt, Rte. 7 Todds Road., Lexington, Ky. 40502

Filed May 4, 1976, Ser. No. 683,080

Int. Cl.² B26D *5/20*

U.S. Cl. 83—204 **14 Claims**



1. In an apparatus for cutting segments from a strip of material including feed means to feed the material, said feed means including means movable from a first position to feed the material, first inactivating means to inactivate said feed means to stop feeding of the material in response to a selected length of the material being fed by said feed means past a cutting position; cutting means to cut the feed material at the cutting position; first responsive means responsive to said feed means to activate said cutting means to cut the fed material substantially simultaneously with stopping of said feed means; second responsive means responsive to said cutting means completing cutting of the fed material to cause return of said cutting means to its inactive position; sensing means to sense when the thickness of the material being fed by said feed means exceeds a predetermined thickness and when the thickness of the material being fed by said feed means ceases to exceed the predetermined thickness after having exceeded the predetermined thickness or when the thicknss of the material being fed by said feed means is less than a predetermined thickness and when the thickness of the material being fed by said feed means ceases to be less than the predetermined thickness after having been less than the predetermined thickness; second inactivating means to cause inactivation of said feed means after said sensing means has sensed that the thickness of the material has ceased to exceed the predetermined thickness after having exceeded the predetermined thickness or has sensed that the thickness of the material has ceased to be less than the predetermined thickness after having been less than the predetermined thickness irrespective of whether said feed means has fed the selected length of material, said second inactivating means causing activation of said cutting means substantially simultaneously with inactivation of said feed means; the improvement comprising:

automatic means to cause activation of said feed means;

initiating means to activate said automatic means to cause initial activation of said feed means by said automatic means wherever said automatic means is ineffective, said automatic means causing activation of said feed means each time that said movable means of said feed means returns to its first position after said feed means is initially activated; and

third inactivating means to inactivate said automatic means in response to said second inactivating means being effective.

4,033,216

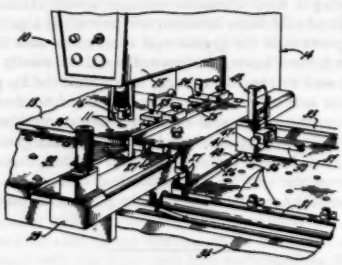
DUPLICATING PUNCH PRESS WITH STYLUS CONTROL

Theodore F. Brolund, and James F. Helgert, both of Rockford, Ill., assignors to W. A. Whitney Corporation, Rockford, Ill.

Filed Sept. 24, 1976, Ser. No. 726,246

Int. Cl.² B26F *1/02*

U.S. Cl. 83—413 **2 Claims**



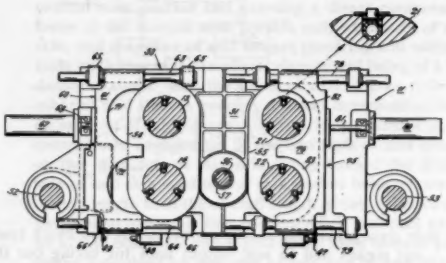
1. A punch press for punching holes in a workpiece in locations determined by the position of holes in a template, said press comprising a punch, an actuator connected to said punch and selectively operable to advance said punch through said workpiece, a carriage having a clamp for holding said workpiece and adapted to be moved to locate said workpiece beneath said punch, a plunger mounted to move with said carriage, said plunger also being mounted to move relative to said carriage between a retracted position in which the plunger is spaced from said template and an advanced position in which the plunger is telescoped into one of said holes in said template, selectively operable means for moving said plunger to said advanced position prior to advancement of said punch, and means responsive to initial contact of said punch with said workpiece and operable to cause said plunger to automatically move to said retracted position as said punch continues to advance whereby said plunger is retracted out of said hole in said template to free said carriage, said clamp and said workpiece to shift in unison as said punch moves through said workpiece.

4,033,217

SLITTER HAVING CARRIER FOR SELECTIVE ADJUSTMENT OF A PLURALITY OF HEADS

Stephen S. Flaum, New York; Francis A. Connolly, College Point, and Paul Chu, Amityville, all of N.Y., assignors to S&S Corrugated Paper Machinery Co., Inc., Brooklyn, N.Y.

Filed Jan. 13, 1976, Ser. No. 648,665
Int. Cl.² B23D *19/06*; B26D *1/24*
U.S. Cl. 83—425.4 **11 Claims**



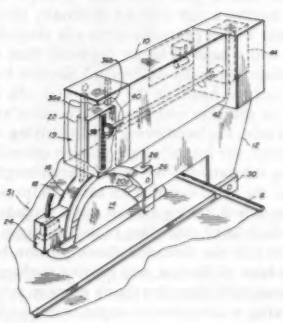
1. Slitting apparatus for longitudinally cutting a relatively wide web of sheet material into a plurality of narrower webs while such wide web is moving longitudinally; said apparatus comprising first and second stations each including first and second parallel shafts mounted for rotation on fixed centers, a plurality of tool mounting head pairs rotated by said shafts and adjustable therealong; power driven adjusting means for operatively positioning the head pairs of said first station while the head pairs of the said second station are slitting a wide web as it moves through an operating area of said second station and for operatively positioning the head pairs of said second station while the head pairs of the first station are slitting a wide web as it moves through an operating area of said first station; each of said fixed centers remaining in the same respective position during slitting and during adjustment of said head pairs along said shafts.

4,033,218

TABLE-SAW GUARD

Leo P. Donatelle, Chicago, Ill., assignor to Spanjer Brothers, Inc., Chicago, Ill.

Filed June 4, 1976, Ser. No. 692,809
Int. Cl.² B27G *19/02*
U.S. Cl. 83—478 **8 Claims**



1. In a table-saw having a saw-motor drive with a motor starting circuit connected to a source of power and a saw guard mounted on one end of an overhead arm with a hinge-means mounted on the table at the other end of the arm for tilting said arm relative to the table, the combination with said table-saw of:

a. a saw-motor starting circuit switching means having a gate terminal operationally connected through the motor starting circuit to the source of power;

b. a vertical-positioning means for the guard mounted between the guard and the arm and operationally connected to ground from the source of power through a manually-operated reversing-polarity switching means, having a vertical position-sensing, saw-motor shut-off means mounted between the workpiece and the guard operationally connected through the saw-motor starting circuit switching means to ground for shutting off the saw-motor drive from said source of power when the guard is above the top surface of the workpiece by a predetermined space;

c. a horizontal, position-sensing, saw-motor shut-off means for the guard operationally mounted on the arm and operationally connected to the source of power through the saw-motor starting circuit switching means to ground for shutting off the saw-motor drive from said source of power when the guard is not horizontal; and

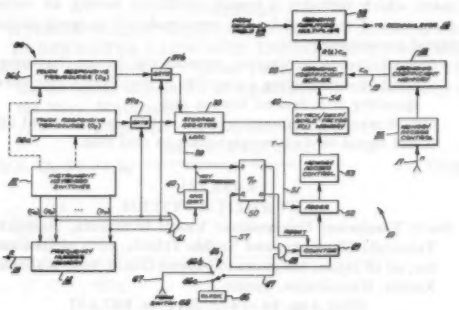
d. a vertical and horizontal, position-sensing, saw-motor drive time-delay shut-off means for the guard operationally mounted on the arm and between the workpiece and the guard and operationally connected from the source of power through the saw-motor starting circuit switching means to ground for providing the operator with a time delay during which the saw-motor will start and run as long as saw-cutting continues.

4,033,219

TOUCH RESPONSIVE CONTROL SYSTEM FOR A KEYBOARD ELECTRONIC MUSICAL INSTRUMENT

Ralph Deutsch, Sherman Oaks, Calif., assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Feb. 27, 1975, Ser. No. 553,585
Int. Cl.² G10H *1/02*, *3/00*
U.S. Cl. 84—1.03 **13 Claims**



1. A touch responsive system for a keyboard electronic musical instrument of the type wherein a note is generated upon depression of a corresponding key on said keyboard, comprising;

a touch responsive transducer associated with each key of said instrument, each transducer providing an output indicative of the force or velocity with which the corresponding key is depressed,

a memory storing a set of amplitude scale factors in consecutive memory address locations so that a predetermined amplitude envelope will result when said scale factors are accessed sequentially,

access means for accessing a subset of said scale factors from said memory in a preselected order, the accessed scale factors being utilized by said instrument to establish the amplitude envelope of the note generated upon depression of a selected key, said access means including circuitry for sequentially accessing storage locations in said memory, and

control means, responsive to the output of the transducer of said selected key, for modifying the subset of scale factors accessed from said memory, so that said amplitude envelope is responsive to the touch with which said key is struck, said control means establishing, in response to said transducer output, the initial address at which said sequential accessing begins, so that the maximum envelope amplitude is established by the force or velocity with which said selected key is depressed.

4,033,220

TEMPO SETTING DEVICE

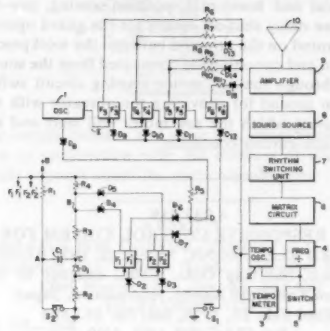
Masashi Shibahara, Kishiwada, Japan, assignor to Nihon Hammond Kabushiki Kaisha, Osaka, Japan

Filed June 9, 1975, Ser. No. 585,403

Claims priority, application Japan, June 12, 1974, 49-67466

Int. Cl.² G10F *1/00*

U.S. Cl. 84—1.03 **13 Claims**



1. A tempo setting device for an automatic rhythm instrument which includes a tempo oscillator having an output frequency determined by the magnitude of an input control signal comprising:

control means actuatable repetitively by an instrument player for producing a plurality of signals at a rate corresponding to a desired tempo; and

circuit means for converting said signals into an input control signal related in magnitude to said rate.

4,033,221

KEY SWITCH SYSTEM

Norio Tomisawa, Hamamatsu; Yasuji Uchiyama, Hamakita; Takatoshi Okumura, and Toshio Takeda, both of Hamamatsu, all of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Aug. 11, 1975, Ser. No. 602,631

Claims priority, application Japan, Aug. 12, 1974, 49-92173

Int. Cl.² G10F *1/00*

U.S. Cl. 84—1.03 **7 Claims**

1. Key switch system comprising:

a key time clock source;

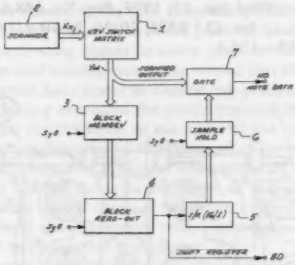
a key switch matrix including a plurality of scanning lines, a plurality of output lines each constituting a block, and a plurality of key switches at respective intersections of said scanning lines and said output lines;

a scanner connected to scan said scanning lines sequentially and repetitively at a rate established by the key time clock, each complete scan of all scanning lines constituting a scanning cycle;

a block time clock source producing a block time signal at the end of each complete scanning cycle;

a block memory connected to said output lines and memorizing for each block any existence of a pulse in said output lines per scanning cycle, each such pulse representing a switch that is ON in said block;

block read-out means connected to said block memory and generating in one scanning cycle after another respective block data consisting of one pulse per scanning cycle, the time slot of said one pulse within said scanning cycle indicating the block which contains a key switch that is ON; and



note data generating means connected to said block read-out means and to said output lines for taking out the scanned output as the note data of that block which was indicated by the block data in the preceding scanning cycle.

4,033,222

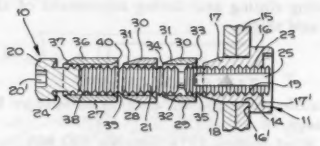
MULTIPLE SLEEVE BLIND FASTENER

Leslie B. Wilson, Yorba Linda, Calif., assignor to Monogram Industries, Inc., Santa Monica, Calif.

Continuation-in-part of Ser. No. 606,720, Aug. 21, 1975, abandoned. This application Aug. 12, 1976, Ser. No. 713,696

Int. Cl.² F16B *13/06*

U.S. Cl. 85—72 **11 Claims**



1. In a blind fastener system having a skin with reduced permanent deformation, said skin having a driving side and a blind side and a hole extending through the skin, a blind fastener having a nut with an internally threaded axial bore throughout with a generally conically shaped nose portion at one end and a head of larger diameter than said hole and an intermediate generally cylindrical portion between the nose portion and the head, at the other end, the nut being within the hole in the skin with the nose portion extending beyond the blind side, the head being on the driving side and abutting thereagainst, the intermediate portion extending into the hole and being substantially the same overall length as the depth of said hole, the head exerting an axial compressive force on the hole, a core bolt having a head and a threaded shank portion, the core bolt head extending outwardly from the nose portion of the nut and the threaded shank portion being threaded in the axial bore of the nut, and bearing surface means rotatably mounted on said threaded shank portion, said bearing surface means being in compressive engagement with the blind side of said skin and the head of the core bolt, said conical nose portion receiving said bearing surface means thereon and said bearing surface means exerting a direct compressive force on the conical nose portion only exteriorly of said skin, the improvement which comprises:

said bearing surface means includes at least a pair of expansible sleeves, each of said sleeves being comprised of an outwardly expansible ductile material and having sub-

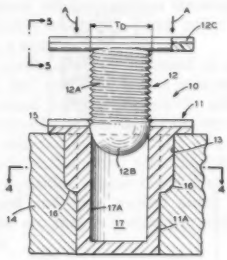
stantially the same outer diameter and having a first end, a second end and a main body portion interconnecting said first and second ends and an internal bore of substantially uniform diameter throughout, said core bolt head having core bolt head means for retaining said second ends thereagainst, and each of said sleeves having their first ends in compressive engagement only with the blind side of said skin and their second ends being compressed between the core bolt head means and said blind side, and the internal bore of one of said sleeves receiving the conical nose portion and exerting a direct compressive force on the conical nose portion only exteriorly of said skin, and the other of said sleeves receiving and substantially enclosing said one of said sleeves and being of a less ductile material than the other of said sleeves with the other of said sleeves exerting a direct compressive force on said one of said sleeves only exteriorly of said skin, the compressive engagement of the first ends of said sleeves on the blind side of said skin acting toward the driving side of said skin, said one of said sleeves being greater in overall length than the overall length of said other of said sleeves and having its first end extending generally parallel to said blind side and folded about itself thereby presenting a doubled up first end of said one of said sleeves bearing directly against said blind side, the first end of said other of said sleeves bearing against the side of the doubled-up first end of said one of said sleeves remote from said blind side at substantially the junction of the first end of said one of said sleeves with its main body portion, said doubled-up portion forming a bearing surface bearing against the blind side of said skin.

4,033,223

QUICK SET ADJUSTABLE FASTENER

Steven L. Marks, Alpine, N.J., assignor to Kettering Toys, Inc., Englewood Cliffs, N.J.

Filed July 26, 1976, Ser. No. 708,294
Int. Cl.[2] F16B *13/06*
U.S. Cl. 85—83 **2 Claims**



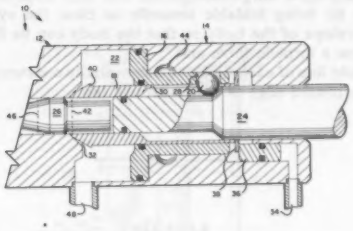
1. A quick set adjustable fastening device comprising:
a sleeve unit adapted to be held in a hole formed in a workpiece,
said sleeve nut having a smooth wall bore, the wall of said bore being formed of a resilient plastic material,
a screw fastener,
said screw fastener having an externally shank portion to be received in said bore,
said shank having a rounded tip end portion,
said rounded tip end portion having a diameter slightly greater than the internal diameter of said bore and substantially equal to the thread crest diameter of said shank, whereby said screw fastener is assembled to said sleeve by pushing the shank of said fastener into said bore.

4,033,224

LIQUID PROPELLANT GUN

John W. Holtrop, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 16, 1976, Ser. No. 723,880
Int. Cl.[2] F41F *1/04*
U.S. Cl. 89—7 **10 Claims**



1. In a liquid gun having a barrel, a receiver, a chamber, a bolt slidably mounted in said receiver and chamber for reciprocating motion along the axis of said barrel, and means for injection of fuel for firing a round from said barrel, the improvement comprising:
valve means in said receiver cooperating with said bolt for controlling access of fuel to said chamber;
pump means in said receiver coaxial with said bolt and cooperating with said valve means and said bolt to pressurize fuel in said chamber.
interconnecting means linking said valve means and said pump means and responsive to action of said bolt to effect injection of fuel from said chamber to a position between the bolt and the round.

4,033,225

HYDRODYNAMIC CONFIGURATION TO BE USED ON UNDERWATER LAUNCHED, UNPROPELLED BODIES

Roy M. Kartzmark, Jr., China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 6, 1974, Ser. No. 440,213
Int. Cl.[2] F41F *3/04*
U.S. Cl. 89—1.81 **1 Claim**

1. In a non-propelled submerged launched elongated buoyant body which has fore and aft end and which has a positive metacentric height, the improvement consisting essentially of:
a pair of major fins mounted at the aft end of the body in a spaced apart relationship;
each fin having a tab which is capable of deflecting from an upward position to a downward position with respect to the fin;
the upward position of the tabs acting in combination to implement a pitching movement of the body toward a vertically upward path in the water;
the downward position of the tabs acting in combination to implement a stabilized roll, pitch and yaw movement of the body in substantially a straight line upward non-vertical glide through the water from a position which is established by the pitching movement of the body;
means for simultaneously changing the tabs from the up-

ward positions to the downward positions at a preselected time so that upward positions of the tabs will bring the body to a desired attitude and then a change of the tabs to the downward positions will maintain the body on a constant attitude upward glide path;

said fins extending beyond the body and being spaced approximately 90° from one another;

the body, except for the fins and tabs, having a smooth cylindrical configuration with a rounded nose and a generally ogive tail portion;

each fin being foldable inwardly to clear the cylindrical envelope of the body so that the body can be launched from a torpedo tube; and

the fold line of each fin being substantially coextensive with the inward edge of the respective tab.

4,033,226

CARTRIDGE HOLDERS

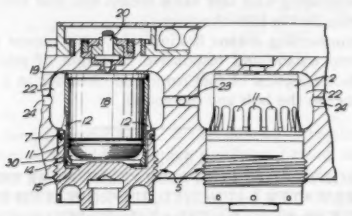
Samuel W. Craigie, Slough, England, assignor to M. L. Aviation Company Limited, Slough, England

Filed Apr. 26, 1976, Ser. No. 680,225

Claims priority, application United Kingdom, Dec. 30, 1975, 53136/75

Int. Cl.² F42B 3/00

U.S. Cl. 89—1.5 F **7 Claims**



1. A cartridge holder for fitting into the breech opening of an ejection release unit, said holder comprising:

a base part having a bottom portion and a cylindrical wall portion extending therefrom to form with the bottom portion a cup shape,

a wall part formed as a continuous cylinder with one end thereof fitting into the cylindrical wall portion of the base part while the remote end of the wall part extends beyond the outer end of the wall portion to form an extension of the cup shape of the base part,

said wall part including means for holding a cartridge from said remote end thereof inwardly less than the full way to the said bottom portion of the base part to thereby provide a space between the cartridge and the said bottom portion of the base part,

limiting means for limiting and defining full insertion of the wall part within the base part,

means for providing a gas flow path from said space within the wall part to a location between the wall part and the wall portion of the base part upon full insertion of the wall part within the base part,

and further means for defining the engagement of the wall part within the base part to provide a further gas flow path communicating with the first gas flow path and extending along between the outer side of the wall part and the inner side of the said wall portion, and continuing to the exterior of the base part,

and connecting means on the outside of the base member for engaging the said breech opening to secure the cartridge holder in the ejection release unit.

4,033,227

MAGAZINE SPECIALLY INTENDED FOR TANK WITH LARGE-CALIBRE FIREARM

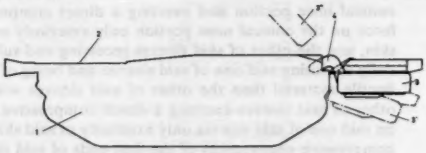
John Folke Eklund, and Sven-Håkan Svensson, both of Karlskoga, Sweden, assignors to AB Bofors, Bofors, Sweden

Filed Sept. 25, 1975, Ser. No. 616,519

Claims priority, application Sweden, Oct. 18, 1974, 7413124

Int. Cl.² F41H 7/06

U.S. Cl. 89—34 **20 Claims**



1. A magazine for use on a tank having a large-caliber firearm, said magazine comprising a magazine body adapted to contain a plurality of rounds therein, said magazine body being separated from the tank chassis and being freely suspended on the outside of the tank at a position low on the tank at the rear end of said tank and in spaced relation to the tank chassis below the top of said chassis by means of at least one fastening member which extends between said magazine body and the rear end of said tank chassis, said fastening member being constructed to move flexibly relative to said tank chassis if said body should strike the underlying ground.

4,033,228

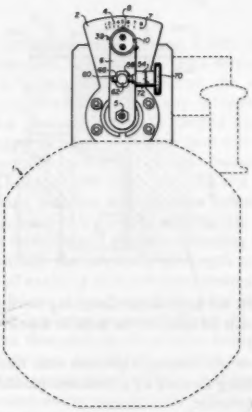
ZONE SETTING ASSEMBLY WITH TEMPERATURE COMPENSATOR FOR WEAPON SYSTEMS OF THE "SOFT RECOIL" TYPE

Harold Herman Wiese, Davenport, Iowa, and Steven Ray Schade, Rock Island, Ill., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 28, 1976, Ser. No. 700,641

Int. Cl.² F41F 19/10

U.S. Cl. 89—42 B **4 Claims**



1. In a soft recoil weapons system having a breech end and an adjustable velocity sensing device including a shaft for actuating automatic firing of the system when the gun tube velocity during travel toward the muzzle end has reached a predetermined value so that different zones may be targeted, the improvement comprising:

means for varying the velocity response of said sensing

device including a dial face member with spaced calibrated zone setting indicia fixedly mounted on said breech end;

a plurality of spaced pin receiving apertures arranged in said dial face member calibrated to correspond to individual zone setting indicia;

a control member pivotably connected at one end to rotate said sensing device shaft;

a manually actuatable indexing pin handle movably carried at the other end of said control member adjacent the apertures in the dial face member;

a plurality of indexing pins carried for reciprocable movement by the handle, with each pin positioned to engage preselected ones of said apertures depending upon the position of said control handle; and

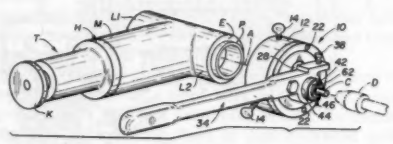
means biasing said pins toward said apertures, whereby, at preselected locations, one or the other of said pins seats in a preselected aperture corresponding to a desired zone setting indicia to latch said control handle in said zone setting position so that said sensor shaft is locked in the desired zone setting position, said pin indexing handle being movable relative to said control handle member to unseat said pins and permit free pivoting movement of said control member for resetting of the zone.

4,033,229

TOOL FOR ENLARGING THE BORE IN A WORKPIECE

Charles Sarnelli, Jr., 4 Hilltop Terrace, Staten Island, N.Y. 10304

Filed May 11, 1976, Ser. No. 685,299
Int. Cl.² B23C *1/20, 3/02*
U.S. Cl. 90—12 R **22 Claims**



1. A device utilizing a cutting tool for enlarging the interior bore in a workpiece, said device comprising:

collar means adapted to be rigidly mounted on the workpiece without relative rotation therebetween;

a plate rotatably mounted on said collar means, said plate including a slot therethrough;

a movable handle pivotally mounted on said plate;

and cutting tool receiving means mounted on said handle for movement together therewith, said cutting tool receiving means being positioned in and movable along the length of said slot by said handle whereby a cutting tool contained in said cutting tool receiving means may be moved to a position against the surface of a bore that is to be enlarged and then moved along the bore surface through an arc that is concentric with the bore in the workpiece.

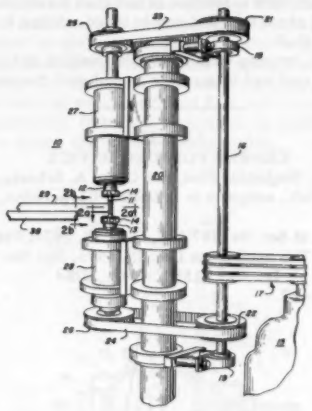
4,033,230

PROFILE CUTTING MACHINE

Rudolph F. Onsrud, 456 W. Frontage Road, Northfield, Ill. 60093

Filed July 2, 1973, Ser. No. 375,664
Int. Cl.² B23C *1/18, 5/26*
U.S. Cl. 90—13.4 **8 Claims**

1. A profile cutting machine comprising a slender cylindrically shaped axially extending elongated double-ended high speed cutting tool having a centrally located cutting portion, said tool being rotatable about said axis, chucking portions at opposite ends of said cutting portion, the length of said tool being substantially greater than any lateral dimension thereof and the lateral dimension of said tool being substantially uniform throughout said cutting portion; axially aligned and rotatably mounted chuck members releasably holding said tool chucking portions and overcoming dynamic cutting loads imposed on the tool during oblique and cross cutting through the full thickness of a workpiece when the latter is moved laterally of the rotary axis of said tool; drive means simultaneously rotating at high speed said chuck members and said cutting tool about said axis at the same angular velocity for overcoming rhythmic and cyclic torsional and bending loads imposed upon said tool during cutting of the workpiece; a



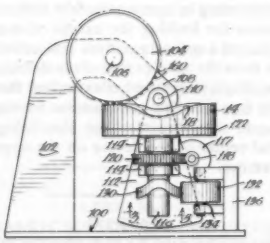
workpiece support mounted for movement in a plane disposed transversely to said axis of rotation for engaging a workpiece between said chuck members for intersecting the central cutting portion of said tool thereby, said workpiece support including a planar work engaging surface oriented transversely to said axis of rotation; and a chassis supporting said chuck members, said drive means and said workpiece support in a predetermined relation for allowing the material cut from the workpiece to fall away from said cutting tool while the workpiece moves past the central portion of said cutting tool.

4,033,231

APPARATUS FOR MACHINING END HOUSINGS

Alexander Goloff, East Peoria, and Hiram A. Brubaker, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 8, 1976, Ser. No. 675,023
Int. Cl.² B23D *5/04*; B24B *17/02*
U.S. Cl. 90—24.3 **7 Claims**



1. Apparatus for machining the end walls of slant axis rotary mechanisms, comprising:

a base;

a support pivoted on said base for rotation in a single plane about a first axis;

a shaft journalled on said support for rotation about a sec-

ond axis nonparallel to said first axis and movable with said support in said single plane;

a work holder carried by and rotatable with said shaft for receiving a housing element of a slant axis rotary mechanism to have an end wall machined thereon said work holder being shiftable with said shaft only in said single plane;

means, including a tool adjacent said work holder operable to perform a machining operation on a housing element received on said work holder;

means for rotating said shaft; and

means responsive to rotation of said shaft for oscillating said support about said first axis in timed relation to rotation of said shaft,

whereby a housing element will be rotated and oscillated against said tool to machine an end wall thereon.

4,033,232

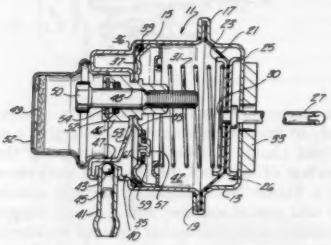
CHARGE FORMING DEVICE

Benjamin C. Benjamin, Flint, and Glenn A. Schautz, Lennon, both of Mich., assignors to Schmelzer Corporation, Durand, Mich.

Division of Ser. No. 507,128, Sept. 18, 1974, Pat. No. 3,965,223. This application Dec. 29, 1975, Ser. No. 645,084

Int. Cl.[2] F15B *13/042, 15/24*

U.S. Cl. 91—47 **4 Claims**



1. A vacuum responsive device comprising: a casing, a flexible diaphragm dividing the casing into two main chambers, resilient means urging the diaphragm to a first position, a rigid wall assembly separating one of the main chambers into first and second subchambers, at least one aperture in said rigid wall assembly, a valve member normally engaging said rigid assembly and closing said aperture against air flow from the first subchamber, bypass means permitting restricted fluid flow in either direction between said subchambers, a vacuum passage adapted to connect said second subchamber with a source of vacuum, a passage means adapted to connect said second subchamber with the atmosphere, the other of said main chambers being in communication with the atmosphere, adjusting means for limiting the extent of movement of the diaphragm toward a second position, said valve member being axially offset from the axial center of the device, said adjusting means comprising a stop member extending through said rigid wall assembly into said first subchamber for engagement with said diaphragm, said stop member also being axially offset from the axial center of the device on the opposite side from the valve member.

4,033,233

FLUID PRESSURE OPERABLE SERVO POSITIONER

Toshio Toi, Kobe, Japan, assignor to Nippon Air Brake Company Ltd., Kobe, Japan

Filed July 7, 1975, Ser. No. 593,742

Claims priority, application Japan, Aug. 30, 1974, 49-99771

Int. Cl.[2] F15B *13/16, 9/10*

U.S. Cl. 91—374 **2 Claims**

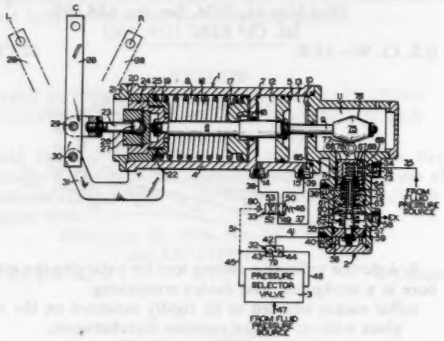
1. Servo positioner apparatus for selectively positioning a mechanical member in a desired position until a change is effected, said servo positioner apparatus comprising:

a. a double acting piston device including a power piston connected to the mechanical member and alternatively subjectable on opposite sides to operating fluid pressure for effecting operation of the mechanical member to respective pluralities of different positions in opposite directions from a normal central position, depending upon which of said opposite sides is subjected to said operating fluid pressure and the degree thereof;

b. control valve means having a cut-off position in which a supply communication, via which operating fluid pressure may be supplied to said power piston, is closed, and being operable, in response to a variable control fluid pressure, to one of a plurality of supply positions in which said supply communication is open for supplying said operating fluid pressure to said power piston at a degree commensurate with the degree of said control fluid pressure;

c. force balancing means including:

i. a spring disposed at one side of said power piston for exerting a biasing force on and urging the power piston toward its said normal central position in opposition to the operating pressure acting thereon, said power piston and the mechanical member assuming one of said plurality of different positions upon attainment of a balanced state between the opposing forces of said spring and said operating pressure acting on the power piston, and



ii. a cam member connected to and positionally movable with said power piston and having a cam surface of predetermined contour operatively engaging said control valve means, said cam surface being operable to one of a plurality of cam positions relative to the control valve means, such cam position corresponding to said one of said plurality of different positions of the mechanical member, for exerting a counter force on said valve means in opposition to said control fluid pressure to produce a balanced state therebetween and in which said control valve means is maintained in said one of said plurality of supply positions;

d. respective delivery pipes connecting to said opposite sides of said power piston; and

e. a changeover valve device interposed between said delivery pipes and said control valve means,

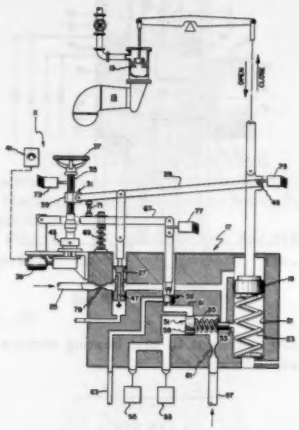
f. said changeover valve device normally biased to a first position in which one of said delivery pipes is communicated with the control valve means for effecting supply of operating pressure to one of said opposite sides of the power piston, and being operable responsively to actuating fluid pressure to a second position in which said one of said delivery pipes is cut off from said control valve means and the other is communicated therewith for effecting supply of operating pressure to the other of said opposite sides of the power piston.

4,033,234

THROTTLE VALVE OPERATOR

Norman E. Nutter, and Herbert N. Hoffman, both of Lunenburg, Mass., assignors to General Electric Company, Schenectady, N.Y.

Filed June 2, 1975, Ser. No. 582,705
Int. Cl.² F15B 9/10
U.S. Cl. 91—384 1 Claim



1. A valve operator for opening and closing a main valve to which the valve operator is connected, said valve operator comprising:

a manifold block including a hydraulic cylinder having a main valve actuating piston slidable therein and biased by spring means in a valve close direction;

a first fluid inlet conduit for supplying hydraulic fluid to said hydraulic cylinder; a pilot inlet and exhaust valve disposed within said first fluid inlet conduit for controlling the flow of hydraulic fluid to said hydraulic cylinder; means for positioning and repositioning said pilot valve according to a desired main valve position including a first lever interconnecting a linearly movable fulcrum with said valve actuating piston and said pilot valve;

a pressure responsive trip relay valve connecting the first conduit and hydraulic cylinder with a first drain, said trip relay valve biased by spring means in an open direction;

trip device for controlling said trip relay valve;

a second fluid inlet conduit for supplying hydraulic fluid to close the trip relay valve upon the reset of said trip device; and,

a reset pilot valve for placing in fluid communication a drain and said second inlet conduit through said trip relay valve when said trip relay valve is in an open position; a pivotally mounted second lever connected to said reset pilot valve to direct said reset pilot valve to a closed position, said second lever including means for following said first lever in the main valve open direction, said second lever being biased by spring means to open said reset pilot valve in following said first lever after the trip relay valve has been closed.

4,033,235

FLUID OPERATED RAM

Lawrance F. Berg, Lockport, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Jan. 26, 1976, Ser. No. 652,357
Int. Cl.² F15B 15/22
U.S. Cl. 91—396 7 Claims

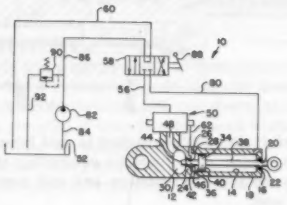
1. A fluid operated ram with means for reducing impact as the ram closes, comprising:

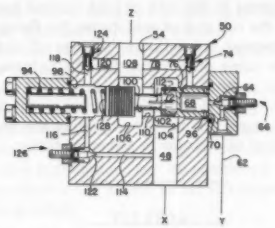
1. a housing defining a generally cylindrical ram bore having a first wall at a first end thereof with a first hole generally centrally therethrough and a second wall at a second end thereof with a second hole generally centrally therethrough leading to a chamber;

2. a piston within said ram bore having a piston rod extending therefrom through said first hole and a snubber extending from an opposite side thereof towards said second hole, said snubber being sized to pass into said second hole in spaced flow restrictive relation thereto towards said chamber to create a relatively higher pressure in said ram bore adjacent said second end thereof than in said chamber;

3. first conduit means communicating with said chamber;

4. valve means arranged to communicate between said first conduit means and a sump, said valve means including means biasing said valve means to provide a substantially unrestricted flow path from said first conduit means to said sump to pass a first fluid flow, said flow path being progressively restricted responsive to shifting of said valve means against said biasing means;





5. second conduit means adjacent said second end of said ram bore and communicating a second fluid flow therefrom with said valve means to shift said valve means in opposition to said biasing means responsive to pressure in said second conduit means exceeding pressure in said first conduit means as said snubber restricts fluid flow from said ram bore to said chamber as said snubber moves towards said chamber, said second conduit means including a first adjustable orifice therein to modify the pressure of said second fluid flow to said valve means and first relief valve means communicating said first orifice and said valve means with said sump to limit the pressure of said second fluid flow;

6. third conduit means communicating with said ram bore adjacent said first wall; and

7. pump means for providing a third fluid flow from said sump selectively to a respective one of said first conduit means and said third conduit means.

4,033,236

ALL HYDRAULIC MOTOR GRADER CIRCUITRY

Howard L. Johnson, and John A. Junck, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

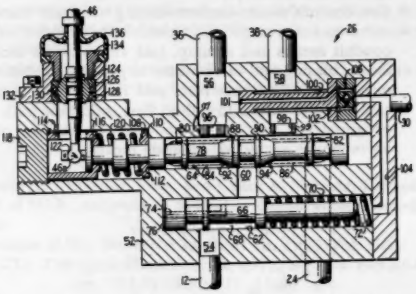
Continuation of Ser. No. 212,184, Dec. 27, 1971, abandoned.
This application Feb. 4, 1974, Ser. No. 652,939
Int. Cl.² F15B 11/08, 13/04
U.S. Cl. 91—463 9 Claims

1. The combination of a control valve and a double acting hydraulic motor including a housing having a cylindrical

chamber divided by a piston and rod assembly into a head end and a rod end having different fluid volumes, said valve comprising:

a valve body having an inlet passage and a pair of motor control passages one of said motor control passages connected to the head end of said motor and the other of said motor control passages connected to the rod end of said double acting motor;

a cylindrical bore in said housing communicating with said inlet passage and said motor control passage;



a valve spool reciprocably mounted in said bore and movable from a neutral position for controlling the flow of fluid between said inlet passage and said motor control passages; and,

restricting means in the one of said control passages connected to the rod end of said motor for fixing the size of said one passage in relation to the size of said other passage to the same proportion that the volume of the rod end of said motor bears to the head end of said motor proportioning the flow of fluid to said motor through said control passages for thereby providing the same velocity movement of said motor in either direction.

4,033,237

HYDROSTATIC PISTON MACHINE HAVING SMALL CLEARANCES BETWEEN BEARING SURFACES

Peter Rutz, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Oct. 29, 1974, Ser. No. 518,983

Claims priority, application Switzerland, Nov. 2, 1973, 15420/73

Int. Cl.² F01B *13/06;* **F16C** *35/00*

U.S. Cl. 91—484 **6 Claims**

1. A hydrostatic piston machine comprising

a pin having at least one bearing surface;

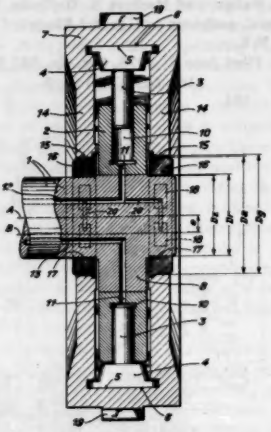
a guide member having a plurality of plane guide surfaces disposed tangentially of a circular cylinder having an axis, said guide member being rotatably mounted about said axis;

a cylinder block rotatably mounted on said pin;

a plurality of movably mounted pistons in said cylinder block disposed radially of said block, each said piston having a foot including a plane bearing surface guided on a respective guide surface of said guide member;

a bearing ring disposed between said guide member and said bearing surface in spaced relation to each of said guide member and bearing surface, said ring having a first clearance from said bearing surface of less dimension than a second clearance from said guide member, said first clearance being sufficient to allow hydrostatic mounting of said ring on said bearing surface and said second clearance being sufficient to permit thermal expansion of said pin and said bearing ring, said first and second clearances being dimensioned such that said bearing ring rotates relative to said pin and remains stationary in said guide member; and

means including lubricating pockets in said bearing surface



for feeding lubricant to said bearing surface to form a hydrostatic bearing.

4,033,238

AXIAL PISTON MACHINE WITH A TILTABLE, REVOLVING CYLINDER DRUM

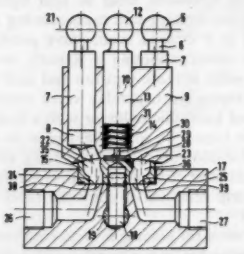
Ludwig Wagenseil, Vohringen, Germany, assignor to Hydromatik GmbH, Germany

Filed Feb. 11, 1976, Ser. No. 657,151

Claims priority, application Germany, Mar. 26, 1975, 2513549

Int. Cl.² F01B *13/04*

U.S. Cl. 91—505 **4 Claims**



1. An axial piston machine having a tiltable, rotating cylinder drum and a drive-connected drive pulley stationarily supported in a casing, pistons movable in cylinder bores of the drum articulated to the drive pulley via ball socket joints, a control mirror member with reniform control ports which face the outlets of the cylinder bores, the control mirror member being tiltable by an adjusting device to adjust the stroke of the pump, the control mirror member having a cylinder surface shaped rear side facing away from the control mirror and supported on a suitable shaped slideway of the casing, orifices in the slideway of the casing connected with suction and pressure ducts for the pressure medium, the orifices being connected via ducts with the reniform control ports in all positions of tilt of the control mirror member, a central pivot supported on the drive pulley for centering the cylinder drum, the pivot extending in a central bore of the cylinder drum and supported against the cylinder drum via an intermediately located compression spring and including connecting duct means extending from the pressure carrying duct through the

mirror member and to the central bore for transmitting the pressure from the pressure carrying duct to the central bore and recess means between the cylinder drum and the mirror member providing a pressure field and a reaction surface on the mirror member on which the pressure in the central bore exerts a force in a direction to maintain the mirror member engaged with the slideway.

4,033,239
RADIAL PISTON MACHINE

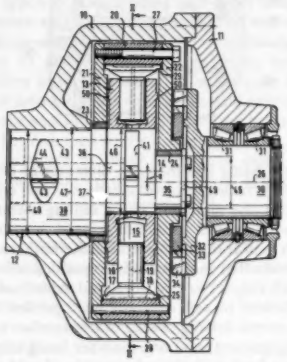
Wilhelm Gsching, deceased, late of Heidenheim, Germany (by Irmgard Gsching, heiress), assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Apr. 10, 1975, Ser. No. 566,810

Claims priority, application Germany, Apr. 13, 1974, 2418164

Int. Cl.² F01B *13/06*

U.S. Cl. 92—58 **2 Claims**



1. A radial piston machine comprising

a housing;

a control journal having a cylindrical part of predetermined diameter fixedly mounted in said housing;

a cylinder block rotatably mounted about an axis of rotation on a first cylindrical bearing surface of said control journal;

a plurality of pistons circumferentially disposed in said cylinder block for radial displacement relative to said control journal, each said piston having a bearing shoe thereon;

a piston-piloting ring mounted around said pistons and said cylinder block, said ring having a plurality of plane surfaces thereon, each said surface being disposed opposite to and in bearing relation with a respective piston bearing shoe, said ring having an axis of rotation offset from said axis of rotation of said cylinder block by a preset eccentricity; and

a pair of rotatable support disks secured to said piston-piloting ring on opposite sides of said cylinder block, an inner one of said disks being rotatably mounted about a second cylindrical bearing surface of said control journal of a diameter greater than said first bearing surface of said cylinder block by at least twice said eccentricity and an outer one of said support disks being rotatably mounted about a third cylindrical bearing surfce of said control journal, said third cylindrical bearing surface being of a diameter smaller than said first bearing surface of said cylinder block by at least twice said eccentricity.

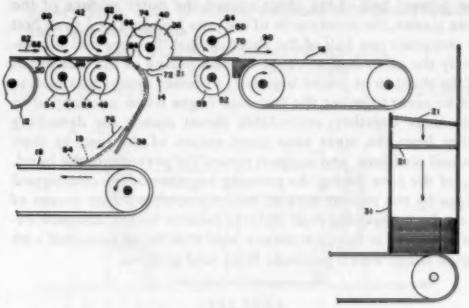
4,033,240
ROTARY STRIPPING WHEEL

Clovis F. Deslauriers, 25-52 Borough Place, Woodside, N.Y. 11377

Filed May 14, 1975, Ser. No. 577,477

Int. Cl.² B26F *3/00*; B31B *1/14*

U.S. Cl. 93—36 A **7 Claims**



1. A waste stripping apparatus of the type employing rotary stripping wheels to remove waste material from the finished product, wherein previously die cut sheets having a leading edge and a plurality of transversely spaced waste rows are fed along a plane to the stripping wheels, which comprises

a plurality of rotary stripping wheels each having a portion of its outer periphery extending below the plane of sheet travel,

at least a portion of the outer periphery of the wheels being provided with surface indentations,

at least one said surface indentation being positioned below the said plane at all times,

said surface indentations being movable into alignment with said plane;

and means to transversely space at least some of the stripping wheels to align a stripping wheel with a waste row,

whereby said indentations can be positioned to contact the leading edges of the sheets to aid in stripping waste from finished product.

4,033,241
APPARATUS FOR MANUFACTURING CARDBOARD TUBES

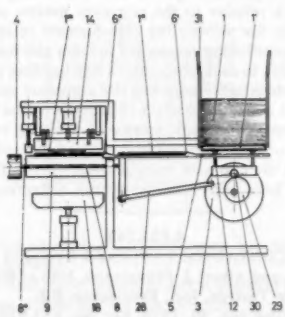
Emilio Roda, Viganello, Switzerland, assignor to Roda Macchine S.A., Noranco, Switzerland

Filed Mar. 17, 1975, Ser. No. 559,045

Claims priority, application Switzerland, Mar. 25, 1974, 4290/74

Int. Cl.² B31B *3/74*

U.S. Cl. 93—39.1 R **2 Claims**



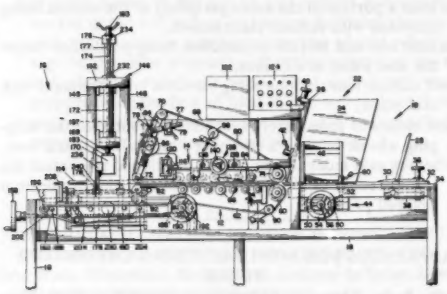
1. A machine for the manufacture of tubes of cardboard or the like sheet material that have a length substantially greater than their width, comprising a core means reproducing the inner shape of the tube to be formed, advancing means for

advancing a sheet to be formed along a generatrix of said core means, guide means for ensuring the exact disposition of the sheet on the generatrix of the core means, holding means for holding the sheet against the generatrix of the core means, two shaping jaws each reproducing about half the outer profile of the tube, the jaws being mounted for rotation around an axis from an initial position to an operative position in which each jaw presses half of the sheet against the outer surface of the core means, the movements of the jaws being phased so as first to compress one half of the sheet against the core and successively the other half to cause superimposing of the free edges of the sheet to be joined together, a presser means arranged to act to press together the two said edges when overlapped to join same together, retractable thrust means for detaching tubes from the inner core upon return of the jaws to their mutual positions, and support means for preventing the bending of the core during the pressing together of the overlapped edges by the presser means, said retractable thrust means of the tube comprising rods slidably located within complementary grooves in the core means, said rods being provided with thrust wings which protrude from said grooves.

4,033,242
CARTON FORMING MACHINE

William A. Rice, Vernon, and Clifford B. Rice, Warehouse Point, both of Conn., assignors to Rice Packaging, Inc., Ellington, Conn.

Filed Sept. 26, 1975, Ser. No. 617,016
Int. Cl.² B31B *3/26*
U.S. Cl. 93—51 R **4 Claims**



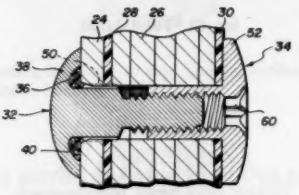
1. A machine for forming cartons from a stack of pre-cut and pre-scored blanks comprising: conveyor means for moving the blanks linearly in seriatim away from the stack, front and rear and side formers adjacent the end of the conveyor means and defining a well, a forming block and means for moving the forming block into and out of the well for forming the carton, first positioning means for positioning the well and forming block relative to the conveyor means, second positioning means for moving the side formers relative to each other, third positioning means for moving the front and rear formers relative to each other, and a flap bending and hot melt applicator subassembly adjacent the conveyor means including means for deflecting certain of the flaps of the blank being fed by the conveyor means, means for retaining certain other of the flaps of said blank against deflection, and means for applying hot melt to said certain other of the flaps of said blank which have been retained against deflection.

4,033,243
CONTAINER FASTENER SYSTEM

Hail Kirrish, and Albert J. Provenzano, both of Rockford, Ill., assignors to Textron, Inc., Providence, R.I.

Filed Jan. 30, 1976, Ser. No. 653,925
Int. Cl.² F16B *35/04, 39/282*
U.S. Cl. 85—4 **10 Claims**

1. In combination, a section of composite panel or the like and a rigid frame section wherein both said panel and frame section define a through bore, and a fastener assembly disposed in said bore in clamping engagement with said panel and frame section to define a joint therebetween, said fastener assembly comprising; a bolt member having a first enlarged head portion at one end and an elongate shank, said shank including an externally threaded segment and an external unthreaded segment disposed intermediate said threaded segment and said enlarged head portion, and a nut member including an elongate sleeve segment having an exterior, unthreaded surface and an internal bore having an internally threaded surface portion engaged with said threaded segment of the bolt member, and a second enlarged head portion on said nut member, such that said enlarged head portions engage said panel and frame sections to effect said clamping engagement, the one of said members having its head portion engaged with said frame section including a plurality of axially extending splines formed on the exterior unthreaded surface portion of said one member and engaged with said bore, said splines having a maximum diameter greater than the diameter of said bore and the diameter of the unthreaded external surface portion on said other member, with the root diameter



of said splines being less than the diameter of said bore, and annular axially facing groove means on the enlarged head portion of said one member, with a sealing member disposed in said groove means and compressed into tight sealing contact with said frame section, and the unthreaded exterior surface of said other member being received in said bore and rotatable with respect to said bore, and drive tool accomodating means formed on said enlarged head portion of said other member to permit driving of said other member to obtain said clamped engagement, said one member being engaged in said frame section bore with the relationship of said splines maximum and root diameter to said bore diameter tending to center said one member relative to said bore during initial engagement, while permitting said member to move axially inward during engagement of said threaded surfaces pursuant to driving of said other member to attain clamped engagement, said splines and the unthreaded surface upon which they are formed both having an axial length such that they extend beyond the portion of the bore defined by said frame section, into that portion formed by said panel section to provide increased resistance to the shearing forces applied to said member at the interface of said panel and frame sections.

4,033,244
SCREW AND SCREW DRIVER

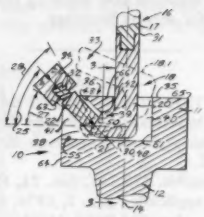
Ralph Spencer Jacobson, 27970 Le Dunne Ave., Aldergrove, British Columbia, Canada

Filed Apr. 27, 1976, Ser. No. 680,715
Int. Cl.² F16B *23/00*
U.S. Cl. 85—45 **7 Claims**

1. A screw for use with a screw driver; the screw driver having a shank and a generally V-shaped screw engaging means at an end of the shank, the screw engaging means having a root portion, a transverse portion and an oblique portion, the root portion extending from the shank as an axial extension of the shank to join the transverse portion, the transverse portion interconnecting the root and oblique portions, and the oblique portion extending obliquely from the

transverse portion so as to define the generally V-shaped screw engaging means; the screw having a threaded body and a screw head disposed on a central axis of the screw, the screw head having an outer surface, and a driver engaging means characterized by:

a. a bridge portion adjacent the outer surface of the screw head remote from the body, the bridge portion having a bridge axis coincident with a chord of the screw head being displaced radially outwardly from a diameter of the screw head with the entire bridge portion being located to



one side of said diameter, the bridge portion also having spaced opposed bridge inner and outer side walls, the bridge inner side wall being parallel to and radially displaced from said diameter of the screw head an amount sufficient to permit the screw engaging means of the screw driver to be retained in the screw with the shank of the screw driver aligned with the central axis of the screw,

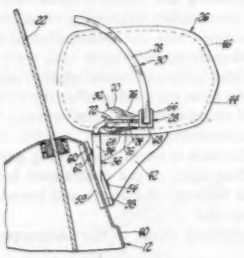
b. a clearance passage extending under the bridge portion to accept the V-shaped screw engaging means, the passage having clearance at inner and outer ends thereof for insertion and removal of the V-shaped engaging means.

4,033,245

VEHICLE AIR DEFLECTOR

Delbert D. DeRees, Utica, Mich., assignor to American Motors Corporation, Detroit, Mich.

Filed Apr. 2, 1976, Ser. No. 672,948
Int. Cl.² B60J 1/20
U.S. Cl. 98—2.12 **9 Claims**



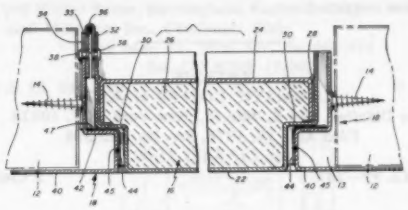
1. A vehicle air deflector for use with a vehicle side door including a vertically movable window, a rear view mirror, and a detachable mirror support for mounting the mirror on the exterior of the door adjacent the front extremity of the window, the air deflector comprising: an air scoop; a support member having a support portion that supports the air scoop and a plate-like mounting portion having inwardly and outwardly facing surfaces; said inwardly and outwardly facing surfaces of the mounting portion on the support member being respectively engaged with the door and the detachable mirror support during mounting so as to be maintained in position on the door; the plate-like mounting portion of the support member having an opening for receiving rear view mirror remote controls; securement screw apertures in the mounting portion of the support member on opposite sides of the opening therein; and an adjustable connection that mounts the air scoop on the support portion of the support member.

4,033,246

VENT

Arthur P. Jentoft, Kennebunkport, and Paul A. Couture, Emery Mills, both of Maine, assignors to Wasco Products, Inc., Sanford, Maine

Filed Feb. 9, 1976, Ser. No. 656,131
Int. Cl.² F24F 7/00, 13/00
U.S. Cl. 98—42 R **22 Claims**



1. A vent for venting smoke from a floor of a multi-story building and carrying the smoke via a vertical shaft in the building, said vent comprising;

a metallic frame comprising peripheral wall means,

means for securing the wall means of the frame in an opening in a wall defining the shaft,

said peripheral wall means comprising vertical walls including on one side of the frame at the inner side of the shaft wall an inwardly facing hinge receiving edge,

a door dimensioned to fit within the wall means defining the frame,

hinge means including one hinge part secured along the hinge receiving edge of the wall means and another hinge part secured to the door for hingedly supporting the door from the frame along a non-vertical axis so that the door is permitted to swing open by gravity into the shaft,

and latch means including latch parts carried by the door and frame, respectively,

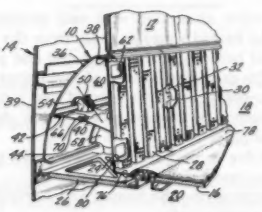
and means disposed outwardly of the door and frame for releasing the latch parts to permit the door to open.

4,033,247

VENT STRUCTURE

Dennis E. Murphy, Costa Mesa, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Dec. 17, 1975, Ser. No. 641,429
Int. Cl.² F23L 17/00
U.S. Cl. 98—119 **18 Claims**



1. A vent for equalizing the pressure on opposite sides of a structure comprising:

a movable vent panel which in a first position restricts the flow from a first side of the structure to a second side thereof; and

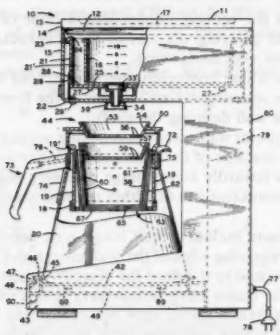
a plenum chamber pneumatically connected to the first side of the structure, said chamber having at least one movable wall having first and second sides, said first side of said movable wall being in pneumatic connection with the

first side of the structure and said second side of said movable wall being in pneumatic connection with the second side of the structure so that differential pressure across the structure applies force to said wall, and bias means for urging said movable wall into a first position, said movable wall being operatively connected to said vent panel to maintain said movable vent panel in said first position thereof when said movable wall is in its first position whereby a predetermined differential pressure is capable of overpowering said bias means to move said movable wall to a position which allows said movable vent panel to move to a second position wherein flow from the first side of the structure to the second side is less restricted.

4,033,248
AUTOMATIC COFFEE MAKER

Marco DiSalino, 129 E. 90th St., New York, N.Y. 10028

Filed Aug. 18, 1976, Ser. No. 715,398
Int. Cl.² A47J *31/00*
U.S. Cl. 99—281 9 Claims

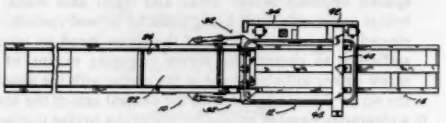


1. An automatic beverage maker comprising
an upper housing, vertical support walls, a removable back and a base,
a compartment unit and water reservoir within said upper housing,
said upper housing having a bottom,
a top cover for said upper housing, having means to direct any water or condensed steam from leaving said upper housing,
a heating element for supplying heat to said water reservoir,
a ceramic member having a central pipe passing through the bottoms of said compartment unit and said water reservoir,
a thermal valve associated with said ceramic member to permit the heated water to drain from the reservoir,
a heat shield between said heating coil and pipe,
a circular flange on the bottom of said upper compartment unit surrounding the lower end of said pipe,
means to permit the heated water within the reservoir to enter said pipe,
a thermal valve to permit the heated water to drain out of said water reservoir,
a carafe for receiving the heated and filtered coffee,
a handle for said carafe,
a basket for seating upon said carafe,
a removable cap at the base of said basket,
said removable cap having a silk screen,
said basket having a circular spreader cover,
said spreader cover having a dished central portion,
openings on the bottom of said spreader cover,
a paper filter cup for positioning within said basket,
a support wall member within said paper filter cup,
said support wall member having opening, in its wall,
a dished cover for said support member,
said dished cover having openings to permit the hot water to drain into said support member, said filter cup and into said carafe,
a metal circular warming plate for placing said carafe thereon,
said base of said beverage maker having legs raising said base of said beverage maker above the surface upon which it rests,
electrical wiring and thermal control means to permit the water in said reservoir to be heated to the desired temperature and to maintain said warming plate at the desired temperature for serving beverage.

4,033,249
METHOD FOR FORMING BALES

Roman Schmalz, Milwaukee, and Robert J. Wolf, Waukesha, both of Wis., assignors to Logemann Brothers Company, Milwaukee, Wis.

Division of Ser. No. 435,241, Jan. 21, 1974, Pat. No. 3,942,429. This application Jan. 2, 1976, Ser. No. 645,977
Int. Cl.² B65B *13/02*
U.S. Cl. 100—3 1 Claim



1. A method of forming a strapped bale comprising the steps of:
a. positioning a strapped bale between upper and lower bale restraining members with one end of the bale positioned adjacent the exit end of a baling chamber in which a compression ram is mounted for reciprocal movement, the exit end of the baling chamber having a pair of bale material restraining gate members mounted on opposite sides thereof;
b. introducing bale material into the baling chamber;
c. reciprocating the compression ram to progressively form a bale against said one end of the strapped bale and at the same time pushing the newly formed bale between the upper and lower bale restraining members to thereby force the strapped bale out from between the upper and lower bale restraining members;
d. separating the adjacent ends of the unstrapped and strapped bales from each other after the strapped bale has been pushed completely out from between the upper and lower bale restraining members;
e. retracting the bale material restraining gate members to expose all four sides of the unstrapped bale after it has been pushed between the upper and lower bale restraining members; and
f. applying horizontal straps to the unstrapped bale.

4,033,250
PNEUMATIC BUFFERING SYSTEM

Carlos Dean Pinkstaff, Chardon, Ohio, assignor to The Babcock & Wilcox Company, New York, N.Y.

Filed June 18, 1975, Ser. No. 587,943
Int. Cl.² B21D *43/00*; B21J *13/08*; F15B *15/22*; F16P *1/00*
U.S. Cl. 100—53 6 Claims

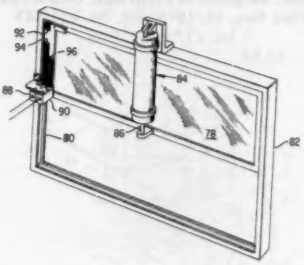
1. A pneumatic system for controllably driving down a vertically raised press safety curtain to the end position of a predetermined vertical path comprising:
a first pneumatic pressure source having a first pressure level;
a second pneumatic pressure source having a second pressure level higher than said first pressure level;

a linear actuator having a pair of opposed pressure chambers;

a piston movable in said linear actuator in response to the pressure difference in the opposed pressure chambers of said linear actuator, said piston being coupled to the press safety curtain to move the press safety curtain with movement of said piston;

sensing means for detecting the position of the press safety curtain along the predetermined path and establishing control signals indicative thereof; and

valve means responsive to the control signals of said sensing means for sequentially applying said first pressure level from said first pressure source to one of the opposed



pressure chambers of said linear actuator to quickly drive the press safety curtain through a first downward part of the predetermined path, applying said second higher pressure level from said second pressure source to the other of the opposed pressure chambers of said linear actuator while exhausting pressure from said one pressure chamber to buffer the speed and momentum of the press safety curtain through a second part of the predetermined path and exhausting the other pressure chamber of said linear actuator to drive the press safety curtain through the remaining part of the predetermined path to quickly close it without causing a shock to the safety curtain and press.

4,033,251

STRUCTURAL CELLULAR MATERIALS

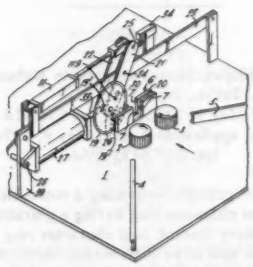
Peter John Thwaites, Eltisley, and Peter Waterworth Joyce, Eynesbury, both of England, assignors to Dufaylite Developments Limited, England

Filed July 20, 1976, Ser. No. 707,472

Claims priority, application United Kingdom, July 23, 1975, 30722/75

Int. Cl.² B30B *3/04*

U.S. Cl. 100—95 **17 Claims**



1. Apparatus for treating continuous unexpanded structural honeycomb material formed of permanently creasable material which comprises roller means for drawing the material in the expansion direction thereof whilst compressing it perpendicularly to the expansion direction to a second unexpanded state and advancing it in the second unexpanded state, a guide for receiving the advancing material from said rollers and guiding it forward whilst permitting it to expand to a slightly re-expanded state and, for severing the slightly re-expanded material in the slightly re-expanded state, a double acting severing device and an actuator operable to move the double acting severing device across the material in forward and return cutting strokes.

4,033,252

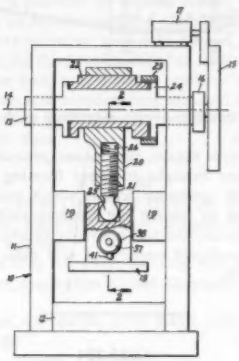
PRESSES

Cyril Walter Baker, Birmingham, England, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Mar. 15, 1976, Ser. No. 666,924

Int. Cl.² B30B *15/00*

U.S. Cl. 100—99 **5 Claims**



1. In a press mechanism having means for adjusting the shut height, a device for indicating the instantaneous position of a movable slide relative to a fixed frame comprising:

a. a first rack slidably supported in the slide and adapted to engage the frame and remain stationary relative thereto when biased in one direction outward from the slide;

b. means alternatively for yieldably biasing said first rack in the one direction and for moving the first rack in the other direction for withdrawal into the slide and away from contact with the frame;

c. a pinion carried by the slide and in mesh with the first rack; and

d. an indicator on the slide driven by the pinion and operative to display the position of the slide relative to the frame when the first rack engages the frame.

4,033,253

FRUIT PRESS

Hubert C. Stollenwerk, P. O. Box 242, and Hubert F. Stollenwerk, R.R. 3, Box 82, both of Egg Harbor, N.J. 08215

Filed Aug. 27, 1975, Ser. No. 608,049

Int. Cl.² B30B *9/04*, *9/24*

U.S. Cl. 100—118 **9 Claims**

1. In an apparatus for deliquifying compressible material comprising a frame, at least one vertically operable hydraulic cylinder dependingly mounted on said frame and having a depending platen, with opposing sides and opposing ends, the improvement comprising:

a. A rigid table beneath said platen;

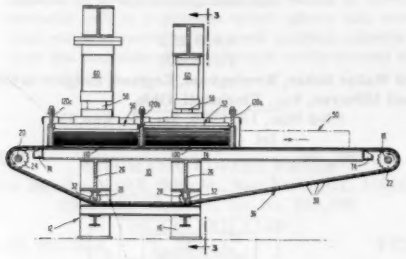
b. A permeable endless conveyor having a surface overlying said table;

c. Rigid, permeable side means, one on either side of said platen, and substantially coextensive therewith and comprising a plurality of vertically spaced slats, each of said side means having an inner face;

d. Screen means substantially covering the inner face of each of said sides;

e. Indexing means mounted to said frame and each of said sides to index said sides toward and away from each other;

f. Rigid, vertically extending restraining means, one at either end on said platen and transverse to said side means and substantially coextensive with said platen;



g. Means vertically movably mounting each of said restraining means;

h. Said conveyor means, side means, restraining means and platen when brought together forming a substantially sealed rigid container within which said mass may be compressed to release juice substantially only through said side means and said conveyor means while maintaining the non-liquid portion of said mass in single compacted form.

4,033,254

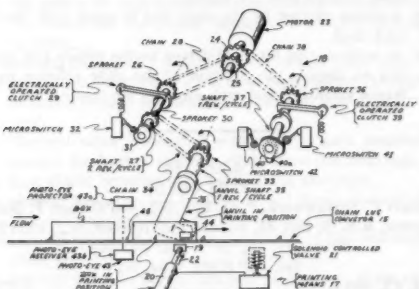
METHOD AND APPARATUS FOR PRINTING ON THE SIDE OF EMPTY BOXES

Hubert Earl Tobey, Milltown; John William Hood, East Brunswick; Alphonse Michael Masiuk, Englishtown; Dee Lavern Irvin, Moonachie, and George Otto Moller, Dumont, all of N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Jan. 29, 1976, Ser. No. 653,424

Int. Cl.² B41F *17/24*

U.S. Cl. 101—44 **9 Claims**



1. Printing apparatus in association with a conveyor conveying in sequence a plurality of boxes to a printing position for printing on a selected side panel of each of said boxes comprising:

a rotatable L-shaped anvil having a toe positioned to engage an interior portion of each of said boxes in sequence and to place said toe of said anvil and each of said boxes in said printing position, said toe of said anvil remaining in engagement with said interior portion of each of said boxes during said printing;

printing means disposed at said printing position and adjacent the exterior of said selected side panel; and

control means coupled to said anvil and said printing means to control the rotation of said anvil into said printing position and to actuate said printing means when said toe of said anvil and each of said boxes are in said printing position to cause printing on said selected panel.

4,033,255

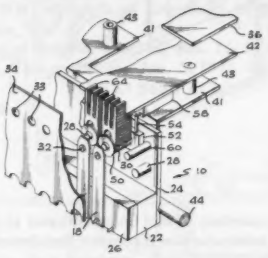
PRINT HAMMER ACTUATOR FOR DOT MATRIX PRINTERS

Robert A. Kleist, Anaheim, and Jerry Matula, Culver City, both of Calif., assignors to Printronix, Inc., Irvine, Calif.

Filed Nov. 13, 1975, Ser. No. 631,449

Int. Cl.² B41J *7/70*

U.S. Cl. 101—93.04 **9 Claims**



1. An actuator system for a dot matrix printer having a plurality of hammer elements disposed along a printing line position and comprising:

a plurality of energizing coils disposed along the printing line position and each in operative relation to a different hammer element;

a plurality of heat conductive elements, each coupled in thermally conductive relationship to a different one of said energizing coils and having a plurality of spaced-apart fins, the fins of the heat conductive elements lying in a common plane;

means for moving the energizing coils and the heat conductive elements along the printing line position;

means for directing an air flow onto the heat conductive elements in a direction generally normal to the common plane; and

means responsive to movement of the energizing coils and the heat conductive elements along the print line for directing a second air flow onto the heat conductive elements in a direction generally parallel to the common plane.

4,033,256

PRINTER

Seiji Hanaoka, Shiojiri, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed May 9, 1975, Ser. No. 575,814

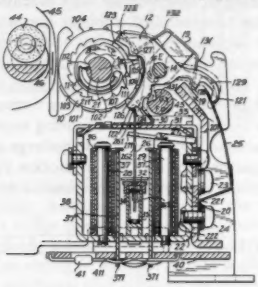
Claims priority, application Japan, May 9, 1974, 49-51470

Int. Cl.² B41J *1/44*

U.S. Cl. 101—99 **8 Claims**

1. An improved printer comprising a rotatable drive shaft means at least one character ring having a plurality of characters on the periphery thereof, said character ring being rotatably supported on said drive shaft means, each character ring having a ratchet wheel including a stop tooth radially mounted thereon, pawl means associated with each said character ring, each said pawl means being coordinately displaceable between a rest position and an engaging position, each said pawl means being adapted to engage the ratchet wheel on said associated character ring when said pawl means is in said engaging position to thereby stop the rotation of said charac-

ter ring, each said pawl means having a first extension and a second extension, said first extension being constructed and arranged to contact the stop tooth on said ratchet wheel when said ratchet wheel is rotated by said drive shaft means to a predetermined rotary position of said ratchet wheel, said stop tooth imparting motion to said pawl means, a biasing means associated with each pawl means for displacing said pawl means from said rest position to said engaging position, restraining means associated with each said pawl means for selectively engaging said pawl means and holding same at said rest position, release means associated with each said restraining means for displacing said restraining means out of engagement with said pawl means to thereby permit said biasing



means to effect displacement of said pawl means from said rest position to said engaging position, return means for returning each of said pawl means from said engaging position to said rest position, and resilient means disposed proximate to said second extension on each said pawl means when said pawl means is in said rest position so that said resilient means is engaged by said pawl means and absorbs the motion imparted to said pawl means when the first extension of each said pawl means is engaged by said stop tooth on said ratchet wheel, when said ratchet wheel is rotated to said predetermined position, and print means for imprinting a selected character carried on each of said character rings when said character ring is stopped by said pawl means associated therewith.

4,033,257

ROTARY DATE STAMP

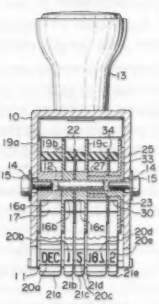
Takaji Funahashi, No. 1, 2-chome, Kitatakasho, Nishi, Nagoya, Aichi, Japan

Filed Jan. 22, 1976, Ser. No. 651,255

Claims priority, application Japan, Feb. 10, 1975, 50-18728[U]; Mar. 19, 1975, 50-37046[U]

Int. Cl.² B41J 1/60

U.S. Cl. 101—111 **3 Claims**



1. A rotary date stamp comprising a frame having a substantially reverse U-shaped form, a bridge built on the lower end portions of said frame, a fixed shaft mounted on substantially intermediate portions of said frame, a plurality of first rotary members supported rotatably on said fixed shaft inside the U-shaped form of said frame, each of said first rotary members having a first annular disc having teeth on the periphery thereof and being fixed to one end each of said first rotary members, said first annular discs being disposed inside the U-shaped form of said frame, a cylindrical shaft supported rotatably on said fixed shaft inside the U-shaped form of said frame and having a second annular disc having teeth on the periphery thereof and fixed to one end of the cylindrical shaft, said second annular disc being disposed inside the U-shaped form of said frame, a second rotary member fixedly supported on said cylindrical shaft so that it can rotate together with said cylindrical shaft, a third rotary member having a third annular disc having teeth on the periphery thereof and fixed to one end of said third rotary member, said third rotary member being loosely supported on said cylindrical shaft, a plurality of endless belts, including first endless belts and a second endless belt, each of said first endless belts being hung around both said bridge and each of said first and third rotary members and having on a surface thereof a plurality of first letters which are frequently used, said second endless belt being hung around said bridge and said second rotary member and having on a surface thereof a plurality of second letters which are not frequently used, an annular partition plate interposed between the second rotary member with said second corresponding endless belt and the third rotary member with said first corresponding endless belt, said annular partition plate having a smaller width than said annular discs, and said second annular disc being smaller in both diameter and width than said first and third annular discs.

4,033,258

PRINTING APPARATUS

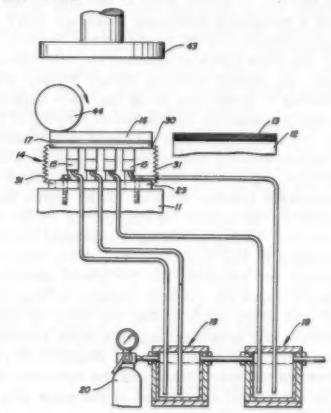
Harold F. Farrow, Hitchin, England, assignor to Colorflo Limited, London, England

Filed May 29, 1973, Ser. No. 364,304

Claims priority, application United Kingdom, May 30, 1972, 25329/72

Int. Cl.² B41M 1/10; B41F 3/00

U.S. Cl. 101—158 **11 Claims**



1. A printing apparatus comprising a printing station, an inking station spaced apart from said printing station, a printing plate at said inking station, said printing plate including a face surface with a design formed thereon and a plurality of passages extending through said printing plate into fluid communication with said design, a plurality of resiliently compressible injector units disposed at said inking station and connected in fluid communication with the face surface of said printing plate through said passages, each of said injector units including means for enabling ink to flow from the injector unit through at least one of said passages in said printing plate onto the face surface of said printing plate upon compression of the injector unit, means for compressing said injector units to provide a flow of ink from said injector units through said passages in said printing plate and onto the face surface of said printing plate, and transfer means for transferring ink from the face surface of said printing plate to sheet

material disposed at said printing station, said transfer means including surface means for engaging the face surface of said printing plate at the inking station to thereby apply ink to said surface means, and means for moving said surface means with ink disposed thereon from said inking station to said printing station and for effecting a transfer of ink from said surface means to sheet material at said printing station.

4,033,259

DEVICE FOR ADJUSTING PRINTING PLATES ON THE PLATE CYLINDER OF PRINTING PRESSES

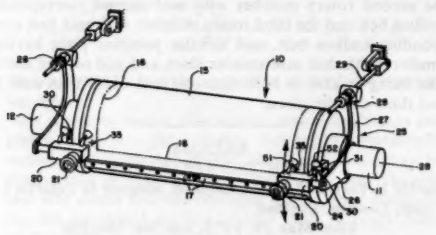
Siegfried Schuhmann, Offenbach, Germany, assignor to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany

Filed June 14, 1976, Ser. No. 695,421

Claims priority, application Germany, June 13, 1975, 2526446

Int. Cl.² B41F *13/12*

U.S. Cl. 101—174 **6 Claims**



1. Apparatus for facilitating peripheral adjustment of a printing plate on a printing cylinder of a multi-color press comprising, in combination, a frame, means for journaling the cylinder in the frame, means fixed at the end of the cylinder for carrying a peripheral reference mark, an index mark on the plate positionally related to the image thereon and in a position on the plate which is adjacent the reference mark on the cylinder, an optical viewing device having magnifying optics including a single eye piece and two objectives, the objectives being spaced for simultaneous viewing of the reference mark and index mark superimposed in the same field of view, the optical viewing device having a screen including an optical reference generally centered in the field of view, means including a bracket secured to the frame for permanently supporting the optical viewing device on the press in a viewing position, means including a threaded adjusting element interposed in the bracket between the frame and the viewing device for adjusting the peripheral position of the viewing device about the cylinder thereby to bring the reference mark and index mark within the field of view of the viewing device, and means including a scale associated with the viewing device for measuring the disparity in peripheral register between the index mark and the reference mark as a criterion for peripheral adjustment of the plate into a condition of peripheral register.

4,033,260

CONTROL SYSTEM FOR MULTI-COLOR ROTARY PRINTING MACHINES, ESPECIALLY FOR ALTERNATE ONE-SIDE AND TWO-SIDE PRINTING

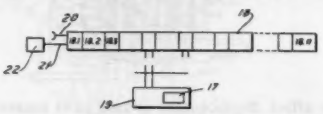
Werner Lein; Kurt Reichenberger, both of Radebeul, and Klaus Schanze, Coswig, all of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed July 29, 1975, Ser. No. 600,070

Int. Cl.² B41F *36/16*

U.S. Cl. 101—232 **1 Claim**

1. In a control system for a multicolor rotary printing machine comprised of a plurality of independently actuatable functional units arranged along the path of travel of sheets through the machine, the machine being of the type capable of printing in a one-side printing mode and in a two-side printing mode in which the sheet path length is longer than in the one-side mode, the path length change resulting upon a printing mode changeover being composed of a fixed component determined by the dimensions of the parts of the machine and a variable component determined by the length of the sheets to be printed, the control system including, in combination, a plurality of actuating means each operative for effecting a predetermined change of state of a respective one of said functional units, each comprised of a first moving means and a second moving means, the first moving means having an activated and an unactivated setting, the second moving means performing in synchronism with machine operation a cycle of motion composed of a longer non-working portion and a shorter working portion, the second moving means being operative for effecting a change of the state of activation of a respective functional unit if and only if the respective first moving means is in the activated setting during the working portion of the cycle of the second moving means; means for causing each second moving means to undergo a sheet-length-dependent phase shift of its cycle of motion upon a printing mode changeover, whereby to compensate for the variable



component of the sheet path length change; a shift register; means for applying to the information-signal input of the shift register a sheet-representing signal; means for causing the sheet-representing signal to travel through the successive shift-register stages in simulation of travel of a sheet through the machine, comprising means for applying to the shift-signal input of the shift register a train of shifting signals synchronized with the cycles of machine operation, the train being comprised of a plurality of component pulse trains phase shifted relative to each other by a fixed angle other than 180° so that a sheet-representing signal will be registered by different ones of the stages for different respective time intervals; a plurality of signal detectors each connected to a respective shift-register stage and operative upon detection of the arrival of a sheet-representing signal at the respective stage for causing a respective first moving means to assume the activated setting; and means operative upon a printing mode changeover for effecting compensatory disconnections of predetermined ones of the signal detectors from the respective shift-register stages and reconnections of such units to predetermined other ones of the stages to compensate for the fixed component of the sheet path length change.

4,033,261

DEVICE FOR DRIVING THE PLATE CYLINDER IN ROTARY PRINTING PRESSES, PARTICULARLY OFFSET PRINTING PRESSES

Eloy Fernandez, Heusenstamm; Claus Simeth, Offenbach, and Georg Herzan, Eschborn, all of Germany, assignors to Roland Offsetmaschinenfabrik Faber & Schleicher AG, Germany

Filed Nov. 1, 1976, Ser. No. 737,208

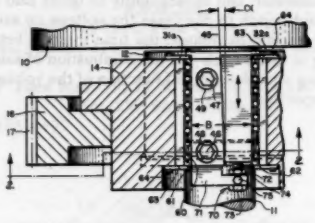
Claims priority, application Germany, Nov. 12, 1975, 2550719

Int. Cl.² B41F *13/14*

U.S. Cl. 101—248 **5 Claims**

1. A drive connection between a plate cylinder of a printing press and the driving gear therefor, the driving gear being axially located with respect to the press frame, comprising, in combination, a sleeve secured to the shaft of the plate cylinder and having a cylindrical outer surface, a hub on the gear having a cylindrical inner surface which is freely telescoped over the outer surface of the sleeve, the sleeve and hub having

respective radially opposed axial grooves keyed together by an entrainer, the entrainer presenting parallel lateral surfaces for registering with the groove in the hub, the entrainer being formed of a base wedge portion and a slide wedge portion mated in complimentary fashion along a substantially radially extending plane which is arranged at a shallow angle with respect to the cylinder axis, the base wedge portion having means for securing it in seated position in the groove formed



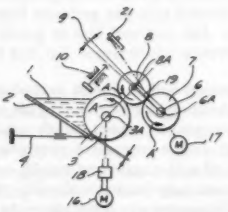
in the sleeve, and axial adjusting means captively interconnecting the wedge portions for adjusting the relative axial positions of the wedge portions in opposite directions thereby to vary the spacing between the parallel lateral surfaces to achieve a precise sliding fit with the groove in the hub thereby to take up any rotational play between the sleeve and the hub while enabling relative axial shifting of the cylinder for the purpose of adjusting axial register of the printing plate.

4,033,262

INK APPLICATOR FOR PRINTING APPARATUS

Hans Johne, Radebeul; Arndt Jentzsch, Coswig, and Gunter Schumann, Radebeul, all of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed Mar. 18, 1976, Ser. No. 668,923
Int. Cl.² B41L 27/16
U.S. Cl. 101—350 **7 Claims**



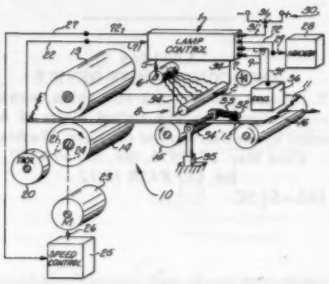
1. A liquid-applying apparatus comprising a bath of a liquid; a pickup roller having and being rotatable about a central axis and partially immersed in said bath; means for rotating said pickup roller about its axis in a predetermined rotational sense; an applicator roller spaced from said pickup roller and having and being rotatable about an axis parallel to the pickup roller axis; means for continuously rotating said applicator roller about its axis in the same rotational sense as said pickup roller at a predetermined peripheral speed; a transfer roller in radial contact with said applicator roller and having and being rotatable about an axis parallel to the pickup roller and applicator roller axes; means including a plurality of meshing gears one of which is fixed to said transfer roller and another of which is fixed to said applicator roller for continuously rotating said transfer roller about its axis in a rotational sense opposite to that of said pickup roller and that of said applicator roller and at a peripheral speed different from and forming a fixed ratio with said peripheral speed of said applicator roller; and means for oscillating said transfer roller about the applicator roller axis into periodic radial contact with said pickup roller.

4,033,263

WIDE RANGE POWER CONTROL FOR ELECTRIC DISCHARGE LAMP AND PRESS USING THE SAME

Abraham W. Richmond, West Melbourne, Fla., assignor to Harris Corporation, Cleveland, Ohio

Division of Ser. No. 532,172, Dec. 12, 1974. This application Oct. 20, 1975, Ser. No. 623,680
Int. Cl.² B41F 23/00
U.S. Cl. 101—416 A **7 Claims**



1. In a printing press for printing electromagnetic radiation curable printed matter on sheet material and an arc discharge lamp for emitting electromagnetic radiation to effect curing of the printed matter, apparatus for controlling the energization of said lamp comprising:

a transformer having a primary winding and a secondary winding;

means for connecting said secondary winding to said lamp;

A.C. power supply control means for connecting said primary winding to A.C. power supply lines for supplying A.C. voltage to said lamp through said transformer of sufficient amplitude to ionize the gas in said lamp so that said lamp fires to emit electromagnetic radiation and controlling the level of A.C. power supplied to said lamp from said A.C. power supply lines, said control means being responsive to a control signal for varying the amount of power supplied to said lamp in dependence upon the value of said control signal;

feedback means for providing said control signal and including detection means for detecting the amount of power supplied to said lamp to provide an output signal, and means for comparing said output signal with a reference signal indicative of desired lamp output intensity and providing said control signal having a value in dependence upon any difference therebetween; and,

said feedback means also including means for further varying said control signal so as to have a value dependent upon the speed of said printing press so that the intensity of radiation emitted by said lamp varies in dependence upon the speed of said printing press.

4,033,264

EXPLOSIVE CARTRIDGE

Frederick Bolza, East Hawthorn; Lubos Vojtech Sadek, Essendon, and Richard Fox, Rosanna, all of Australia, assignors to ICI Australia Limited, Victoria, Australia

Continuation-in-part of Ser. No. 506,542, Sept. 16, 1974, abandoned. This application Apr. 16, 1975, Ser. No. 568,684
Int. Cl.² C06C 11/00
U.S. Cl. 102—24 R **22 Claims**

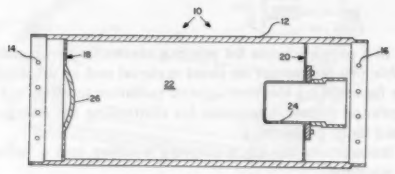
1. An explosive cartridge comprising a container formed from a sheet of non-resilient pliable material and within the container a water-bearing friable gelled explosive composition which comprises at least 50% w/w water-soluble inorganic oxygen releasing salt, at least one fuel and from 5 to 14% by weight of water gelled with from 0.1 to 5% by weight of the said composition of at least one complex which has been prepared by a process comprising the steps of (1) reacting

under polymerising conditions a first water soluble monomer with at least one further monomer which carries a group which reacts with a metal ion or which may be converted to a form capable of reaction with a metal ion for a time sufficient to form a copolymer which is soluble at least in part in an aqueous medium and (2) forming a complex by reacting the copolymer so obtained with a redox system or a product or products derived from the redox system which comprises at least one metal ion.

4,033,265
ANTI-COMPROMISE DEVICE

Clifford T. Johnson, and Melvin J. McCubbin, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 25, 1976, Ser. No. 670,197
Int. Cl.² F42B *13/12*
U.S. Cl. 102—56 SC **2 Claims**

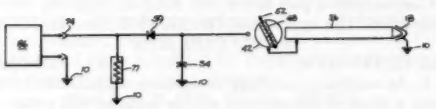


1. In a warhead section for a guided missile or the like the combination comprising:
- a substantially cylindrical casing;
- forward and aft bulkheads fastened within said casing and forming therebetween a chamber for containing a high explosive material;
- said rear bulkhead having means associated therewith for detonating said explosive material; and
- said forward bulkhead including a planar peripheral portion and means associated therewith so constructed as to form a forward jet of molten metal when said explosive is detonated;
- said last mentioned means including a centrally located spherical contoured portion of malleable ferrous metal bulging inwardly with respect to said chamber and having a thickness greater than said planar peripheral portion.

4,033,266
ELECTRICAL FUZE WITH SELECTABLE MODES OF OPERATION

Richard T. Ziemba, Burlington, Vt., assignor to General Electric Company, Burlington, Vt.

Division of Ser. No. 545,843, Jan. 31, 1975. This application June 29, 1976, Ser. No. 701,005
Int. Cl.² F42C *11/00, 17/00*
U.S. Cl. 102—70.2 R **3 Claims**

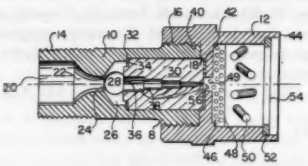


1. A method of manufacturing and operating an ordnance projectile having an impact detonated type fuze to provide a selectively variable delay in the time between impact of the projectile with a target and the detonation of said fuze, said projectile including a resistance type primer, a capacitor, a detonator, and a normally open switch which closes on impact, comprising:
- providing as said detonator a resistance type detonator whose firing time increases as a function of a decrease in applied firing current;
- applying a voltage concurrently and in parallel across said primer and said capacitor initially to charge said capacitor to a selectively variable voltage level which is a predetermined function of the firing current to be applied to said detonator, and subsequently to ignite said primer;
- closing said switch to discharge the voltage on said capacitor across said detonator, the time interval between the closing of said switch and the combustion of said detonator being a predetermined function of the voltage level of said capacitor.

4,033,267
FLUERIC CARTRIDGE INITIATOR

Joseph W. Morris, Indian Head, Md.; Bryan L. Cram, Washington, D.C., and Vincent P. Marchese, Morris Township, Morris County, N.J., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 1, 1976, Ser. No. 728,806
Int. Cl.² F42C *5/00*
U.S. Cl. 102—70 R **9 Claims**



1. In combination with a flueric cartridge initiator of the type wherein a housing being defined by aft and forward ends, includes a convergent-divergent nozzle axially incorporated through said aft end, a transverse vent passing through the divergent zone of said nozzle and axially oriented with said nozzle, a resonance tube having a plurality of resonance cavities aligned in decreasing size order along the longitudinal axis of said resonance tube, and wherein a pyrotechnic transfer charge in juxtaposition with said resonance tube is ignited by thermal energy generated as a gas introduced into said flueric cartridge initiator through said nozzle undergoes periodic compression and expansion within said resonance cavities, the improvement which comprises: means for sealing said flueric cartridge initiator so as to prevent gas blowback, wherein said means includes:
- said convergent-divergent nozzle also forming a tube holder having an externally threaded forward end, said forward end being machined along its longitudinal axis so as to accept a deformable input washer;
- said resonance tube, inserted into said tube holder so as to form a leak-tight seal with said input washer when said flueric cartridge initiator is fully loaded,
- an output charge holder having an internally threaded aft end for mating with forward end of said tube holder;
- a deformable output washer, for creating a leak-tight seal between the forward end of said resonance tube and said output charge holder; and
- a high strength thermal disk for preventing gas blowback from said transfer charge; and

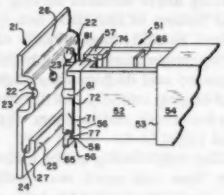
said transfer charge, including a small diameter section of ignition material adjoining a larger thin layer section of ignition material, thereby permitting ignition of said transfer charge.

4,033,268

END FITTING FOR CARGO BAR

Virginia M. Klekar, 1719 Mendocino Drive, Concord, Calif. 94521

Filed Mar. 19, 1975, Ser. No. 559,926
Int. Cl.² B61D 45/00
U.S. Cl. 105—497 12 Claims



1. An end fitting for a cargo bar formed for use in coupling said cargo bar to a first belt rail, said first belt rail being formed as a horizontally extending strip having a horizontally extending outwardly protruding section with a plurality of side-by-side openings therein, a second belt rail formed as a horizontally extending strip having a horizontally extending outwardly protruding section with side-by-side vertically extending slots therein, and a third belt rail formed as a vertically extending strip having a vertically extending protruding section with vertically extending generally aligned slots therein, said end fitting including a shank formed for mounting to an end of said cargo bar, said shank terminating in a coupling end, and a first coupling means and a second coupling means extending from said coupling end and formed to secure and couple said end fitting to said first belt rail, said second belt rail and said third belt rail, respectively, wherein the improvement comprises:

a pair of spaced apart flange means extending outwardly from said coupling end, said flange means being formed and dimensioned for cooperative engagement of said first belt rail with said first coupling means and further for cooperative engagement of said second belt rail with said second coupling means so as to assist in preventing uncoupling of said cargo bar under cargo loading forces when coupled to either of the belt rails,

said flange means extending horizontally over and under said outwardly protruding section of said first belt rail and being formed to extend outwardly from said coupling end to substantially the same distance therefrom for engagement with and bearing upon said first belt rail above and below said protruding section, at least one of said first and said second coupling means being mounted to said coupling end for selective movement to a first position enabling coupling with one of the belt rails and to a second position enabling the remainder of said first and said second coupling means to be coupled to the remainder of the belt rails,

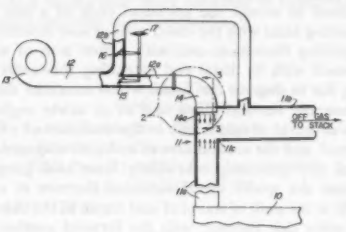
said first coupling means being formed as at least one pin disposed intermediate said flanges and formed and dimensioned for mating insertion into said opening in said first belt rail, said pin being mounted for selective movement to and from said first position at which said pin is inserted in said openings in said first belt rail and to and from said second position at which said pin bears upon said protruding section of said second belt rail intermediate said slots.

4,033,269

METHOD AND APPARATUS FOR CONTROLLING GAS FLOW

Alma M. Little, Salt Lake City, Utah, and Harry R. Ralston, Silver City, N. Mex., assignors to Kennecott Copper Corporation, New York, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,149
Int. Cl.² F23L 11/02
U.S. Cl. 110—160 5 Claims



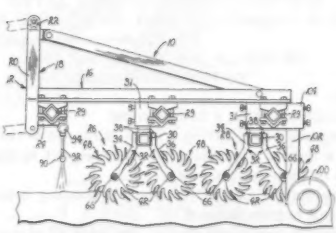
1. A method of controlling flow of gas through a conduit of a gas handling system, which conduit has an abrupt bend therein, comprising introducing a control gas into the conduit in direct opposition to the normal through-flow of gas into said bend and at a flow rate effective to accomplish the degree of control of said normal through-flow desired through a range of substantially no normal flow to substantially full normal flow, the introduction of control gas being in the form of a multiplicity of jet streams arranged in side-by-side adjacency and extending substantially entirely along one cross-sectional dimension of the conduit in a series which extends along the other cross-sectional dimension of the conduit substantially normal to said one cross-sectional dimension thereof, and said introduction of control gas being substantially without reduction of the cross-sectional area of said conduit or interference with gas flow through said conduit at said location at introduction when full normal flow is desired.

4,033,270

AGRICULTURAL SOIL CHEMICAL INCORPORATOR

Paul A. Bezzerides, 14092 Ave. 416; Robert A. Bezzerides, 14142 Ave. 416, and Dave W. Vradenburg, 14092 Ave. 416, all of Orosi, Calif.

Filed May 19, 1975, Ser. No. 578,485
Int. Cl.² A01C 23/00; A01B 35/16
U.S. Cl. 111—6 14 Claims



7. A soil chemical incorporator implement comprising:

a frame disposed for movement over a field having seed beds formed therein along a path aligned with said seed beds, said frame having a front end, a rear end and a pair of oppositely disposed sides, said frame having attachment points suitable for mounting said implement on a three point suspension mounting of a tractor, and wheel means disposed to support said frame in a ground related condition;

a plurality of spider wheels, each having a central mounting hub, a wheel body extending radially outward from said hub, and a plurality of spokes projecting radially outwardly from said wheel body, and having blade means attached to the distal ends of said spokes;

a plurality of mounting arms, each having a proximal end disposed for interconnection with said frame and a distal end disposed to rotatably mount the hub of one of said spider wheels;

a first spider wheel gang bar attached to said frame and disposed to mount the proximal ends of a pair of said mounting arms with the distal ends of said mounting arms depending therefrom and with a first arm of said pair disposed with its distal end extending forwardly of said gang bar to dispose the spider wheel mounted thereon in a generally vertical plane and at an acute angle to the path of travel of said frame in the direction of a first side thereof, and the second arm of said pair disposed with its distal end extending rearwardly from said gang bar to dispose the spider wheel mounted thereon at an acute angle to the path of travel of said frame in the direction of the other side thereof, with the forward portion of said spider wheel on said second arm being in substantial alignment with the rear portion of the spider wheel on said first arm along the path of travel of said frame; and

a soil chemical dispenser disposed in front of said frame ahead of the forwardmost of said spider wheels.

4,033,271

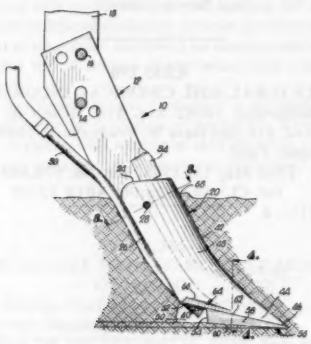
APPARATUS FOR SUBSOIL APPLICATION

Donald E. Williams, and Forrest E. Robertson, both of Garden City, Kans., assignors to Acra-Plant, Inc., Newton, Kans.

Continuation of Ser. No. 520,732, Nov. 4, 1974, abandoned, which is a division of Ser. No. 395,587, Sept. 10, 1973, abandoned. This application Feb. 13, 1976, Ser. No. 657,720

Int. Cl.[2] A01C *23/02*

U.S. Cl. 111—7 **6 Claims**



1. In a subsoil knife, a body having:

an elongated blade having a front, a rear, a bottom, a top, and a pair of opposite sides with respect to the normal path of travel of the body,

the longitudinal axis of the blade extending between said top and bottom thereof,

said blade having a soil-slicing, line edge all along the front thereof which is devoid of flat surfaces extending transversely of said normal path of travel of the body,

said sides of the blade progressively diverging from said line edge as said rear of the blade is approached,

said bottom of the blade sloping upwardly and rearwardly from said front of the blade in the same plane as a pair of diagonally extending line edges on said opposite sides of the blade;

an elongated soil-firming wedge integral with said blade along said bottom of the latter, the longitudinal axis of said wedge extending between said front and rear of the blade,

said wedge having a pair of lateral triangular faces converging downwardly and inwardly to a common lowermost, soil-creasing, fore-and-aft extending line edge and diverging upwardly to form said diagonal line edges with the sides of the blade,

said soil-slicing line edge, said soil-creasing line edge, and said diagonal line edges leading to and converging forwardly in a soil-piercing point on the body,

said wedge terminating rearwardly at a location spaced forwardly from said rear of the blade to thereby define a recess topped by said bottom of the blade and fronted by the rear termination of said wedge; and

a pair of elongated, fore-and-aft extending wing projecting outwardly from said opposite sides of the blade directly above said recess,

said wings having lower surfaces serving as lateral extensions of said bottom of the blade and lying in the same diagonal plane as said diagonal line edges, said wings further having upper surfaces sloping downwardly and forwardly toward said diagonal line edges,

said wings converging laterally and forwardly toward said point at the same rate and in linear alignment with said diagonal line edges,

said diagonal line edges being at the lateralmost extremity of the body from said point rearwardly to said wings, whereupon, from the wings rearwardly, the wings represent the lateralmost extremity of the body.

4,033,272

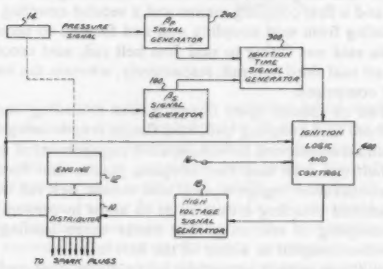
ELECTRONIC IGNITION TIMING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Robert Samuel Henrich, Farmington Hills, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed May 14, 1975, Ser. No. 577,490

Int. Cl.[2] F02P *5/04*

U.S. Cl. 123—117 R **30 Claims**



1. In combination with an internal combustion engine having a crankshaft, a plurality of combustion chambers, each of said combustion chambers having an associated ignition means, means for generating a high voltage ignition signal in response to ignition time signals, distributor means connected in a first predetermined timing relationship with said crankshaft to communicate high voltage ignition signals to each of said ignition means in a predetermined sequence, sensor means generating load signals indicative of the engine's load and ignition reference signal generating means connected in a second predetermined timing relationship with said crankshaft to generate at predetermined rotational intervals of said crankshaft ignition reference signals for each of said combustion chambers; an ignition timing systemm for generating ignition time signals for triggering said means for generating high voltge ignition signals comprising:

means responsive to said ignition reference signals for generating β_S signals inversely proportional to the ignition advance requirements of the engine as a function of

speed, said β_S signals switching from one predetermined value to another predetermined value in a predetermined sequence and at predetermined time intervals;

means responsive to said load signals for generating β_P signals inversely proportional to the ignition advance requirements of the engine as a function of engine load; and

means integrating said β_S signal between the occurrence of two consecutive ignition reference signals, and dissipating said integrated β_S signal as a function of said β_P signal between the second of said two successive ignition reference signals, a third consecutive ignition reference signal for generating ignition time signals having a time advance from the occurrence of said third consecutive ignition reference signal which is a function of both engine speed and engine load, said ignition time signals triggering said means for generating high voltage ignition signals.

4,033,273
SEWING MACHINE

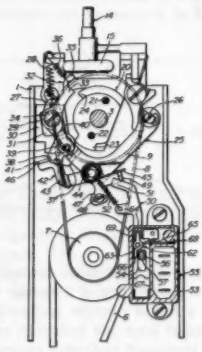
Noboru Kasuga, Hachioji, Japan, assignor to Janome Sewing Machine Co., Tokyo, Japan

Filed Apr. 17, 1975, Ser. No. 569,178

Claims priority, application Japan, Apr. 20, 1974, 49-43894; Apr. 20, 1974, 49-43895; Apr. 20, 1974, 49-43896; Apr. 20, 1974, 49-44131[U]; Apr. 20, 1974, 49-48270

Int. Cl.² D05B *69/00*

U.S. Cl. 112—274 **6 Claims**



1. In a sewing machine, a combination comprising a machine frame; a main shaft rotatably mounted in said machine frame for reciprocating a needle during rotation of said main shaft; drive means for rotating said main shaft; control means movable by an operator between a first position actuating said drive means and a second position deactivating the drive means; stopping means movable between an active position stopping said main shaft and an inoperative position; means cooperating with said stop means for moving the same from said active to said inoperative position when said control means is moved to said second position; further means cooperating with said stopping means for moving it back to its active position while said main shaft makes one revolution upon moving said control means to said first position; and selecting means selectively operable between a plurality of positions, in one which it renders said stopping means operative so that the latter stops said main shaft and in the other of which it renders the stopping means inoperative so that the main shaft rotates continuously when said control means actuates said drive shaft.

3. In a sewing machine, a combination comprising a machine frame; a main shaft rotatably mounted in said machine frame for reciprocating a needle during rotation of said main shaft; drive means for rotating said main shaft; control means for actuating and de-actuating said drive means; stopping means for stopping said main shaft in a predetermined position while said drive mean are actuated by said control means, said stopping means comprising a first cam mounted on said main shaft for rotation therewith, a pawl cooperating with said first cam to stop said main shaft, a second cam mounted on said main shaft for rotation therewith, an actuating member turnably mounted on said pawl and cooperating with said second cam to shift said pawl to a position for cooperation with said first cam, and spring means yieldably biasing said pawl and said actuating member to an inoperative position; and selecting means selectively operable to render said stopping means operative and inoperative.

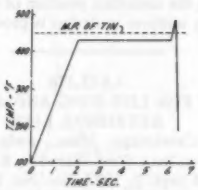
4,033,274
CONTAINERS

Ronald E. Beese, Barrington, Ill., assignor to American Can Company, Greenwich, Conn.

Filed Dec. 31, 1975, Ser. No. 645,685

Int. Cl.² B21D *51/26*

U.S. Cl. 113—120 A **8 Claims**



1. A method of developing a substantially continuous stratum of tin-iron alloy in a seamless shell to serve as a container, obtained from a steel substrate having an adherent unalloyed tin layer on at least one side thereof and comprising:

a. selecting a steel substrate in which the tin layer has a weight of at least 0.375 pounds/BB on the side corresponding to the inner diameter of the shell;

b. drawing the substrate to form an elongated shell of predetermined dimension; and

c. baking the shell at a temperature and for a time sufficient to develop a substantially continuous tin-iron alloy next to the steel substrate, the resultant alloy having a weight of no less than about 0.03 pounds per BB, leaving the balance of the tin in unalloyed form.

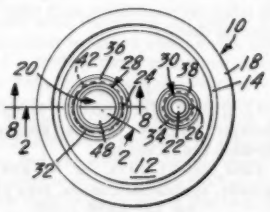
4,033,275
METHOD OF FORMING AN OPENING TAB IN SHEET METAL CONTAINER END CLOSURES

Charles S. Radtke, Little Ferry, N.J., assignor to American Can Company, Greenwich, Conn.

Filed Nov. 3, 1975, Ser. No. 628,501

Int. Cl.² B21D *51/40*

U.S. Cl. 113—121 C **6 Claims**



1. A method of forming a tab for closing an opening in the panel of a metal end closure for a container, which comprises:

deforming a portion of said panel to form therein an out-

wardly projecting bulge having a sidewall portion thereon;

severing said panel substantially entirely about said bulge to produce a tab with a free edge brim portion adjacent the base of said sidewall portion, a narrow, integrally-formed hinge portion connecting said tab to the remainder of said panel, and an opening in said panel defined by a rim portion thereon;

displacing at least said brim portion of said tab to dispose said brim portion inwardly of said rim portion of said panel; and

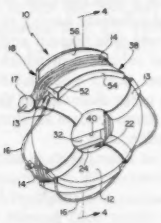
reforming said tab to partially collapse said bulge and to thereby displace said brim portion laterally to a position underlapping said rim portion, said reforming step being effected with mating dies including a male member having a part thereon which is dimensioned and configured to conform closely to at least a part of said sidewall portion of said bulge, so that upon contact of said die and bulge parts the male member will constrain said tab against lateral shifting relative to said opening of said panel, said male member being configured to displace said brim portion to said underlapping position while maintaining the unshifted position of said tab, whereby a substantially uniform underlap is produced.

4,033,276

SUPPORT FOR LIFE RING AND ASSOCIATED RETRIEVAL LINE

Douglas Barr, Cambridge, Mass., assignor to Engineered Safety Products, Inc., West Warwick, R.I.

Filed Sept. 7, 1976, Ser. No. 720,932
Int. Cl.² B63C 9/22
U.S. Cl. 114—190 **13 Claims**



1. A combination support for a relatively rigid life ring and its associated retrieval line comprising, a frame adapted for mounting in a generally vertical disposition and having upper and lower portions each having an outwardly extending member adapted for retaining contact with portions of said ring, each of said frame portions having means for engaging portions of said line when said line is coiled about said frame, said frame portions being vertically movable with respect to each other from an open extended storage position wherein said line is relatively taut to a closed use position wherein said portions are relatively proximal to each other and said line is loosely supported thereby.

4,033,277

UNDERHULL QUICK DISCONNECT MOORING SYSTEM

Manfred Schaper, Calgary, Canada, assignor to Canadian Marine Drilling Ltd., Canada

Filed June 11, 1976, Ser. No. 694,975
Claims priority, application Canada, June 11, 1975, 229113
Int. Cl.² B63B 21/00
U.S. Cl. 114—230 **18 Claims**

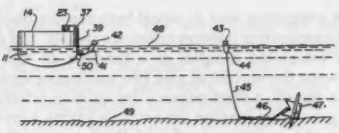
1. A mooring line system for a vessel including a hull, adapted to float on water at a waterline, said mooring line system being in the general form of a catenary comprising:

a. a winch;

b. a sheave associated with said winch;

c. a mooring line or cable secured to the winch, entraining the sheave and secured to a first spar buoy;

d. an anchor chain secured at one end to an anchor and at the other end to a second spar buoy; and



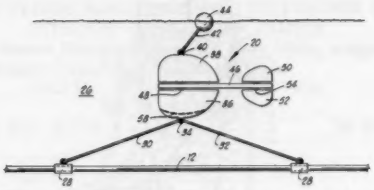
e. a remotely controlled quick disconnect two-part member, one part being secured to first spar buoy and the other part being secured to said second spar buoy, said two parts being adapted to connect the first spar buoy and the second spar buoy together, thereby to provide an anchored mooring line.

4,033,278

APPARATUS FOR CONTROLLING LATERAL POSITIONING OF A MARINE SEISMIC CABLE

Kenneth H. Waters, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Feb. 25, 1976, Ser. No. 661,065
Int. Cl.² B63B 21/56, 17/00
U.S. Cl. 114—245 **5 Claims**



3. In a paravane which includes controllable elements for maintaining lateral positioning of a marine seismic cable, said paravane having a frame portion resiliently supporting said cable in water with at least one hydrofoil extending from said frame means, an improved hydrofoil comprising:

frame means rigidly defining the peripheral shape of said hydrofoil means;

resilient skin material completely covering said frame means;

a plurality of rigid plates bonded to the inside of said resilient skin means on each side of the hydrofoil means which are independently movable relative to said frame means; and

a screw jack assembly affixed between opposite side plates and being movably affixed relative to said frame means such that said screw jack assembly functions to vary the camber and direction of camber of said hydrofoil.

4,033,279

FAIRED CABLE FOR ANCHORING OFFSHORE STRUCTURES

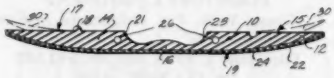
Kenneth M. Stiles, San Dimas, Calif., assignor to Sea-Log Corporation, Pasadena, Calif.

Filed Feb. 27, 1976, Ser. No. 662,218
Int. Cl.² B63B 21/00
U.S. Cl. 114—243 **5 Claims**

1. A fairing assembly for cables which comprises:

a. a pair of elongate elastomeric, wedge shaped body members each having an essentially planar inner surface, a tapered outer surface connected to one edge of each

planar inner surface and extending outwardly therefrom to an elongate flexible web interconnecting said pair of body members at said tapered outer surfaces, and a contoured end wall connected to the edge opposed to said one edge of each planar inner surface and extending to a contoured inner surface provided by the flexible web, one of said body members having at least one shaped projection extending outward from the planar inner surface thereof, the projection progressively increasing in width from the point of connection to the planar surface to a point along the elevation of the projection from the planar surface, then progressively decreasing in width to the



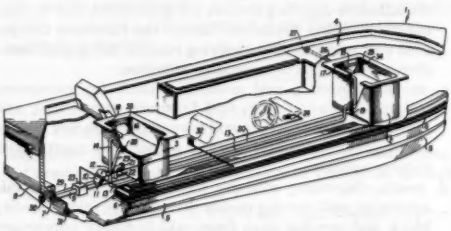
apex thereof, the other of said bodies having a receptacle adapted to receive said projection in interlocking relation, the contoured end walls cooperating with the contoured inner surface provided by the web to form an opening having the shape of the cable to be faired when the shaped projection of one of said body members is interlocked with the receptacle of the other body member and each one edge of each planar inner surface, at the edge of connection to the tapered outer surface, being upwardly turned to form a biased compressive seal when said body members are connected in interlocking relation.

4,033,280

LIVE WELL FOR HIGH SPEED OPEN FISHING BOAT

Forrest L. Wood, and Maurice (Mickey) Carroll Wood, both of Flippin, Ark., assignors to Wood Manufacturing Company, Incorporated, Flippin, Ark.

Filed May 28, 1976, Ser. No. 691,014
Int. Cl.² B63B *35/14*
U.S. Cl. 114—255 **7 Claims**



1. In a boat construction having a hull portion, a top liner portion joined to said hull portion, a live well assembly formed integral with said top liner portion and positioned so that its center of gravity is located on the longitudinal centerline of said top liner portion, the improvement comprising:

a. a common water inlet-outlet port substantially flush with and located in the rear of said hull portion;

b. an aeration means connected in said live well assembly for spraying water therein;

c. a pipeline system connecting said inlet-outlet port with said aeration means; and

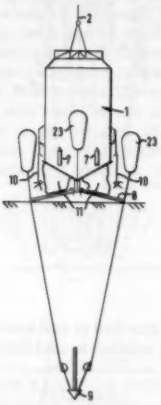
d. a remotely controlled cut-off control valve means connected in said pipeline system for opening and closing water flow through said inlet-outlet port.

4,033,281

EXTRA HEAVY DUTY HYDROSTATIC ANCHOR TOGETHER WITH ITS EXTRA HEAVY DUTY TETHER CABLE

Roy W. Lundh, Glendora, Calif., assignor to Poseidom Marketing and Development Co., Arcadia, Calif.

Filed Jan. 7, 1976, Ser. No. 646,996
Int. Cl.² B63B *21/28*
U.S. Cl. 114—295 **9 Claims**



1. A tethered vehicle for placing a hydrostatic anchor on the sea floor comprising:

a plurality of bins containing concrete;

a big gun placed between said bins for firing a projectile into said sea floor;

said projectile having a plurality of flukes attached thereto, said flukes having at their unattached ends tether cables, each of which is attached to a buoy;

a base plate attached to said vehicle at the lower end of said bins;

a triggering means attached to said vehicle, said triggering means being activated by impact of said vehicle with said sea floor, said triggering means upon activation firing said projectile into said sea floor, releasing said base plate such that it is located on the sea floor above said projectile, and dumping said concrete upon said base plate;

whereby said tethered cables are securely anchored to the sea floor and said base plate forms a hydrostatic anchor.

4,033,282

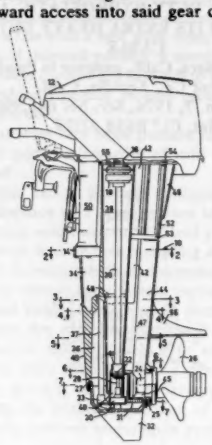
HOUSING FOR OUTBOARD MOTORS

Heinz Pichl, Bergfallsvagen 3, Uppsala 75256, Sweden

Filed Sept. 30, 1975, Ser. No. 618,118
Claims priority, application Sweden, Oct. 2, 1974, 7412395
Int. Cl.² B63H *21/26*
U.S. Cl. 115—17 **12 Claims**

1. In an outboard drive for a boat, an upright unitary die cast housing leg member having an upper end, a lower end, a leading edge and a trailing edge, said member comprising intregral interior walls including walls defining an upright drive shaft cavity and a separate upright exhaust gas cavity, each said cavity opening through said upper end, said drive shaft cavity being terminated downwardly by a lower end wall portion, said lower end wall portion being apertured alignedly with said upright cavity to provide a drive shaft opening therethrough, said drive shaft cavity tapering downwardly toward said lower end wall portion, and further walls defining a gear cavity disposed below said end wall portion and aligned with said aperture, and further walls defining a generally horizontal propeller shaft cavity opening forwardly into said gear cavity and opening rearwardly through said trailing edge, said exhaust gas cavity opening downwardly into said propeller shaft

cavity, said member having a downward lower end opening providing upward access into said gear cavity, and a closure



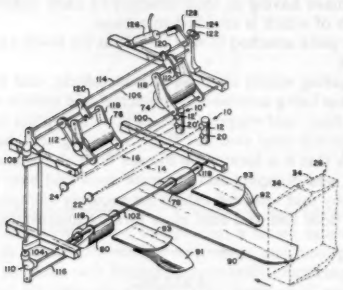
member detachably attached to said lower end of said housing member in covering relation to said lower end opening.

4,033,283

APPARATUS FOR INTERACTING WITH ARTICLES PASSING THERETHROUGH

Thomas P. Rusk, Macon, Ga., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed July 7, 1975, Ser. No. 593,255
Int. Cl.² B05C *1/02*
U.S. Cl. 118—1 **4 Claims**



1. An apparatus for interacting with a predetermined portion of members passing therethrough comprising:

a. first and second detecting means separated a predetermined distance along a given pathway to detect the leading and trailing edges of members moving along said pathway, each of said detecting means having detecting and non-detecting states;

b. control means having first and second circuits, said control means generating an activating signal upon completion of either of said circuits;

c. a first pair of ganged contacts comprised of a first contact in said first circuit and a second contact in said second circuit, said first pair of ganged contacts being operably connected to said first detecting means to open one of said contacts and close the other of said contacts in response to a change in the state of said first detecting means;

d. a second pair of ganged contacts comprised of a first contact in said first circuit and a second contact in said second circuit, said second pair of ganged contacts being operably connected to said second detecting means to open one of said contacts and close the other of said contacts in response to a change in the state of said second detecting means;

e. said first and second pairs of ganged contacts being arranged to complete a circuit only when said detecting means are in dissimilar states; and

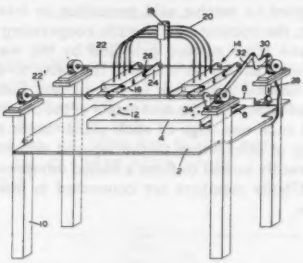
f. means for interacting with a predetermined portion of said members in response to said activating signal.

4,033,284

APPARATUS FOR APPLYING ADHESIVE TO A FURNITURE COMPONENT

William G. Gross, York, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed June 2, 1976, Ser. No. 692,107
Int. Cl.² B05C *11/00*
U.S. Cl. 118—3 **1 Claim**



1. An apparatus for applying adhesive to a furniture component containing a number of apertures designed to receive an application of adhesive and then subsequently assembled to other furniture components, comprising:

a. a surface upon which said furniture component is positioned, a plurality of guide structures to fixedly position said furniture component in a specific position upon said surface,

b. an adhesive-applying structure composed of a mounting structure and several adhesive-applying nozzles, said mounting structure being a mounting block within which the adhesive-applying nozzles are positioned, said mounting block being positioned above the furniture component and said adhesive-applying nozzles being positioned above the apertures to receive adhesive,

c. means mounting said mounting block for movement towards and away from said furniture component, said mounting means moving said mounting block and nozzles into position with said nozzles within said apertures to receive adhesive,

d. means dispensing adhesive from said nozzles into said apertures, said moving means then moving said mounting block and nozzles away from said furniture component after adhesive has been applied to said apertures, and

e. said moving means consisting of

1. two parallel rods,

2. a plurality of levers, said levers being fixedly positioned at their one ends to the rods and on their opposite ends being fastened pivotedly to the mounting block,

3. said parallel rods being mounted for oscillating movement and being positioned one on either side of the mounting block, one said parallel rod moving in a clockwise direction while said other parallel rod moves in a counterclockwise direction, and

4. the oscillating movement of the parallel rods causes the levers fixedly positioned thereon to have an oscillating movement also, said levers being affixed to the mounting block, thereby causing the mounting block to have

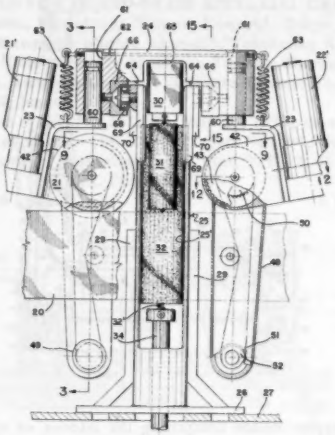
an oscillating movement up and down relative to the surface upon which the furniture component is positioned.

4,033,285

AUTOMATIC OVERHEAD RAIL CLEANER AND OILER

Thomas E. Dugle, and Thomas L. Webb, both of Cincinnati, Ohio, assignors to Klenco Corporation, Massillon, Ohio

Filed Aug. 10, 1976, Ser. No. 713,137
Int. Cl.² B05C *5/00;* E01H *8/00*
U.S. Cl. 118—4 19 Claims



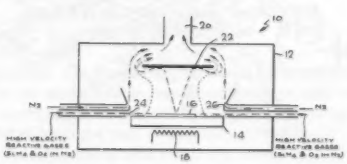
1. An automatic cleaner for riding on and cleaning an overhead conveyor rail, comprising a crosshead, a pair of brackets rotatably supported on said crosshead, a supporting wheel journaled in said brackets for rolling on top of the conveyor rail, a drive motor on each bracket for driving each wheel, an upright tubular post laterally movably mounted at its upper end in said crosshead, a housing secured to the lower end of said post, vertically disposed axially rotatable brushes for contacting opposite sides of said rail, one of said brushes positioned in said post, fluid motor means below and secured to said housing for raising and lowering said one brush, means for continuously rotating said one brush, and means operatively connecting said brushes for simultaneous rotation and vertical movement.

4,033,286

CHEMICAL VAPOR DEPOSITION REACTOR

Shy-Shiun Chern, Los Angeles, and Joseph Maserjian, La Crescenta, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Filed July 12, 1976, Ser. No. 704,468
Int. Cl.² C23C *11/08;* B05D *5/12*
U.S. Cl. 118—49 6 Claims



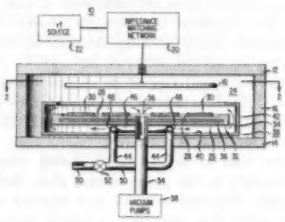
1. A chemical vapor deposition reactor comprising:
a housing;
a horizontaly oriented heating platform positioned within said housing, said platform having an upper surface on which substrates are positioned;
an exhaust from said housing, said exhaust including an outlet chimney position over said heating platform for receiving and removing effluent gases from adjacent said heating platform;
a baffle positioned over said heating platform and beneath said outlet chimney, said baffle being a planar member positioned in parallel alignment with the upper surface of said heating platform;
reactive gas inlet means positioned adjacent said heating platform along the edge of said heating platform for directing reactive gases over the top of said heating platform and across a substrate positioned thereon to have reactive gases flow toward the center of said heating platform from said edge thereof; and
curtain gas inlet means situated adjacent and over said reactive gas inlet means for providing a curtain of non-reactive gas to prevent backflow of said effluent gases.

4,033,287

RADIAL FLOW REACTOR INCLUDING GLOW DISCHARGE LIMITING SHIELD

Frank Bernard Alexander, Jr., Paterson; Cesar Deduyo Capio, Fords, both of N.J.; Victor Emerald Hauser, Jr., Palmerton, Pa.; Hyman Joseph Levinstein, Berkeley Heights, N.J.; Cyril Joseph Mogab; Ashok Kumar Sinha, both of Murray Hill, N.J., and Richard Siegfried Wagner, Bernardsville, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 22, 1976, Ser. No. 651,555
Int. Cl.² C23C *13/08*
U.S. Cl. 118—49.1 R 5 Claims



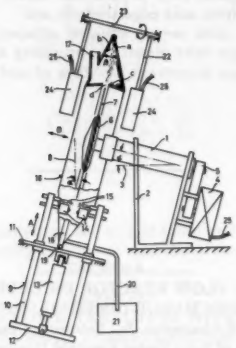
1. Coating apparatus comprising:
an evacuable chamber;
a member located in said chamber having a support region adapted to support at least one object and a central region which defines an aperture therethrough;
means for facilitating a radio frequency discharge within the chamber adjacent the object to form a flow discharge plasma from reactant gases introduced into the chamber;
exhaust means in communication with the centrally disposed aperture in the member; and
coating gas-vapor feed means located adjacent the support region of the member such that gas-vapor feed is induced to flow across the support region of the member in a radial flow and out through the exhaust means, the coating gas-vapor feed means being adapted to substantially inhibit any glow plasma discharge reaction from occurring until reactant gases introduced into he apparatus through the coating gas-vapor means reach the support region of the member.

4,033,288

APPARATUS FOR COATING MAGNETIC DISKS

Josef Woellhaf, Ludwigshafen; Werner Balz, Willstaett; Roland Falk, Achern; Dieter Scheffel, Neuhofen; Volker Richter, Heidelberg, and Paul Willmann, Renchen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Division of Ser. No. 550,363, Feb. 18, 1975, abandoned, which is a continuation of Ser. No. 306,672, Nov. 15, 1972, abandoned. This application July 26, 1976, Ser. No. 708,602
Claims priority, application Germany, Nov. 20, 1971, 2157650; Jan. 3, 1972, 2200023
Int. Cl.² B05C 11/08
U.S. Cl. 118—52 7 Claims



1. An apparatus for coating both sides of a disk with magnetic material comprising:

a rotatable support means whereon said disk is supported in an inclined generally vertical position;

an annular housing which is radially of a generally triangular cross-section and having an inner diameter which is larger than said disk;

means to traverse a pair of opposed coating material projecting nozzles from an inner part of said disk outwardly past the extent of the disk at a lower section thereof whereby to apply coating material to each side of the disk;

means to rotate said support at speeds whereby said coating material is subjected to centrifugal forces to distribute the applied material uniformly over said sides and excess applied material is spun off;

the inner wall of said housing being disposed generally transversely to the plane of said disk, having a generally centrally disposed annular slot aligned with and effectively wider than said disk, whereby to receive said spun off material, and being configurated so as to direct and retain said coating material from returning through said slot;

the plane through the apex of the remaining walls of said housing being offset from the plane of said disk whereby said spun off material received through said slot strikes an inclined internal wall surface of said housing; and

said apparatus including means to dry the coated substrate.

4,033,289

FLUID FLOW DISTRIBUTION DEVICE AND STRIP OILER SYSTEM UTILIZING THE SAME

Herbert E. Taylor, Longmeadow, Mass., and Frederick P. Evans, Bloomfield, Conn., assignors to P/A Industries, Inc., Bloomfield, Conn.

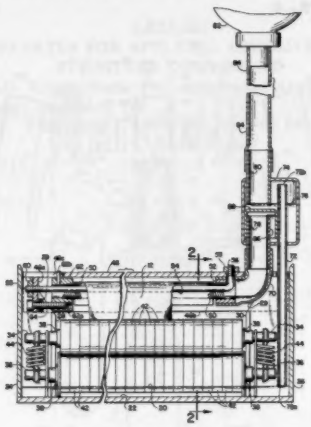
Filed Sept. 29, 1975, Ser. No. 617,634
Int. Cl.³ B05C 1/08; F16N 25/04
U.S. Cl. 118—227 12 Claims

1. A system for distributing oil to at least the upper surface of a continuously moving strip of material said system comprising:

an oil applicator associated with the upper surface of the strip to be oiled,

said applicator including a device for distributing oil transversely of the strip, said device having a tension spring with its longitudinal axis oriented transversely of the strip

oil supply means for said oil distributing device, and including means for feeding oil to said device at a rate which is always in excess of the oil to be applied to the upper surface of the strip,



oil bypass means comprising the interior of said tension spring one end of said spring receiving oil from said supply means,

a sump for the excess oil, and said spring having an end opposite said one end for depositing the excess oil reaching said opposite end into said sump,

means for exerting a desired tension on said spring to spread its convolutions and drip oil downwardly in a uniform manner transversely of the strip at a rate which is adjustable, and

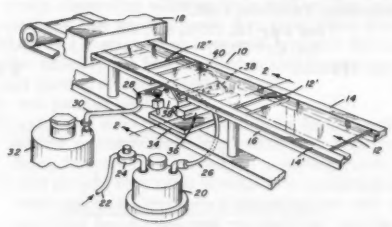
means responsive to the level of the oil in said sump for controlling the rate of flow from said oil supply means.

4,033,290

APPARATUS FOR COATING SHEET MATERIAL

Henry Albert Dude, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,556
Int. Cl.² B05C 11/00
U.S. Cl. 118—266 17 Claims



1. A coating apparatus for coating sheet material with a liquid coating composition, said apparatus comprising

1. a reservoir for holding said liquid coating composition;

2. an absorption wick in communication with said reservoir

to receive coating composition therefrom, said absorption wick having an arcuate surface;

3. a transfer wick in conforming contact with the arcuate surface of said absorption wick to receive coating composition therefrom, one end of said transfer wick being free to move toward and away from said arcuate surface; and

4. means for advancing the sheet material to be coated across and in contact with the end of said transfer wick which is free to move to apply a uniform layer of said coating composition to the surface of said sheet material.

4,033,291

APPARATUS FOR LIQUID-PHASE EPITAXIAL GROWTH

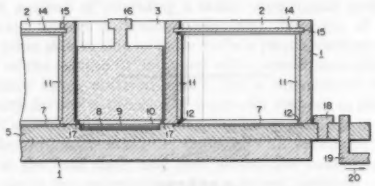
Makoto Naito, Kamakura; Masaru Kawachi, Tokyo; Tetuo Sekiwa, Kawasaki; Minoru Akatsuka, Yokohama; Akinobu Kasami, Yokohama, and Masaharu Toyama, Kawasaki, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 361,543, May 18, 1973, abandoned. This application July 10, 1975, Ser. No. 594,950

Claims priority, application Japan, Mar. 9, 1973, 48-27127

Int. Cl.² B05C *3/09*

U.S. Cl. 118—412 **8 Claims**



1. An apparatus for liquid phase epitaxial growth comprising a boat made of synthetic graphite, a first well formed in the upper surface of the boat to receive an epitaxial solution, a second well formed in the upper surface of the boat to receive a substrate and disposed adjacent to said first well, a lower passage extending longitudinally through the boat from one end to the other end and extending across the bottoms of said two wells, a slide made of synthetic graphite moveable through the lower passage so that the top surface of the slide forms the bottom surface of said two wells, the top surface of the slide having a recess in which the substrate is placed, a fused quartz cylinder the outer periphery of which is contacted with the inner surface of said first well, said first well including an annular stop projected on the lower end of the inner periphery to prevent the fused quartz cylinder from falling from said first well, and a fused quartz layer attached to at least that part of the top surface of the slide which forms said bottom surface of said first well when said recess is beneath said second well.

4,033,292

APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES

Gordon U. Klingenberg, Bloomington, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 21, 1974, Ser. No. 525,698

Int. Cl.² G03G *15/08*

U.S. Cl. 118—629 **4 Claims**

1. Apparatus for developing a latent electrostatic image formed on the surface of an insulating member, said insulating member overlying a conductive substrate comprising:

a chamber having a pair of opposed sidewalls,

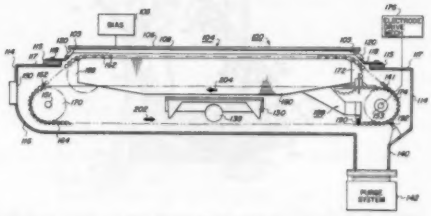
means for supporting said insulating member, said surface facing said chamber,

means for supporting a cloud of charged developer particles to said chamber through a port in one of said opposed sidewalls,

means for supplying gas to said chamber through a port in the other of said opposed sidewalls,

means overlying said ports through which said developer particles and said gas are introduced into said chamber whereby said gas and developer particles are mixed and are directed thereafter to said insulating surface for a predetermined time period to develop said latent electrostatic image,

a development electrode positioned between said insulating surface and said overlying means, said development electrode adapted for movement past said insulating surface during said development period, said development electrode comprising a plurality of substantially parallel con-



ducting elements which extend across the area of the insulating surface upon which the latent electrostatic image is formed, said conducting elements being coupled at each end to a continuous loop member,

drive means for moving said development electrode past said insulating surface, said drive means being coupled to said continuous loop members whereby said development electrode is caused to move past said insulating surface in a direction substantially perpendicular to said parallel conducting elements, and

means for biasing said conductive substrate and said development electrode to a first polarity whereby said latent electrostatic image is developed.

4,033,293

DEVELOPING DEVICE OF AN ELECTROPHOTOGRAPHIC COPYING MACHINE

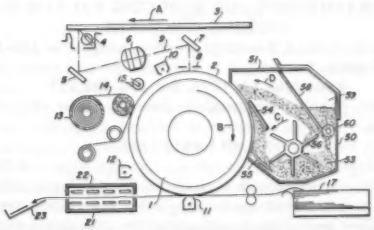
Hitoshi Ohmori, Mino, and Kiyoshi Horie, Atsugi, both of Japan, assignors to Rank Xerox Ltd., London, England

Filed Sept. 13, 1976, Ser. No. 722,946

Claims priority, application Japan, Nov. 20, 1975, 50-138757

Int. Cl.² B05B *5/02*

U.S. Cl. 118—653 **3 Claims**



1. An improved developing device for developing an electrostatic latent image on a photoconductive surface of a copying machine, the device having means for holding a mixture of carrier particles and toner particles, and means for transporting at least a portion of the mixture onto the photoconductive surface, wherein the improvement comprises:

a coating on the surface of the transporting means, the coating having no affinity with the toner particles.

4,033,294

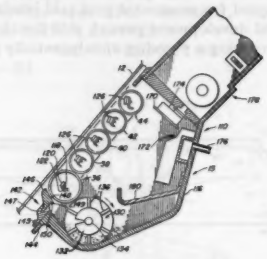
DEVELOPER MIXING AND TRANSPORTING AUGER FOR MAGNETIC BRUSH DEVELOPING APPARATUS

Terrence D. Charland, Pittsford, and Stanley D. Klett, Fairport, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 255,721, May 22, 1972, abandoned. This application Feb. 4, 1974, Ser. No. 439,197

Int. Cl.² B01F 7/02; G03G 13/00

U.S. Cl. 118—658 2 Claims



1. In a magnetic brush developing apparatus for applying developing material to a photoconductive surface to develop electrostatic latent images thereon in an electrostatic printing machine including at least one rotatable magnetic brush roller, and a housing defining a sump zone, said housing incorporating baffle means for cross mixing developing material as said developing material enters the sump zone, a device in said housing for locally intermixing and transporting developing material in the sump zone to said magnetic brush roller comprising:

a rotatable drive shaft, said drive shaft being substantially parallel with said magnetic brush roller;

means downstream of said baffle means for locally intermixing said developing material without substantial axial displacement of said developing material, said intermixing means including a plurality of auger elements on said shaft to promote mixing of said developing material in said sump zone, said auger elements being spaced apart to form a segmented auger, the periphery of said auger elements being circular, and

a plurality of flat bars on the periphery of said auger elements at spaced intervals therearound, said bars extending radially outwardly from said shaft, said bars transporting intermixed developing material from said auger elements to said magnetic brush roller on rotation of said shaft.

4,033,295

ARRANGEMENT FOR REDUCING VACUUM IN MILKING MACHINES

Leif Ake Soderlund, Ronninge, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

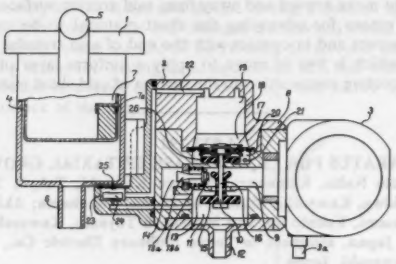
Filed June 12, 1975, Ser. No. 586,277

Claims priority, application Sweden, June 14, 1974, 7407854

Int. Cl.² A01J 5/04

U.S. Cl. 119—14.44 6 Claims

1. In combination with a conduit of a milking machine, a vacuum source and means forming a flow connection between said source and conduit, apparatus for effecting a reduced working vacuum in the conduit, said apparatus comprising a valve body disposed in said flow connection and movable to and from a position in which the reduced working vacuum is obtained, means forming a chamber, an element in said chamber dividing said chamber into two sub-chambers, said element being connected to said valve body for moving said body to and from said position, means forming a passage for connecting one sub-chamber to the vacuum source independently of the positioning of said valve body, said element being movable in response to a pressure change in said one subchamber, and a device operable to open and close said passage to effect movement of the valve body by said element, said passage communicating with the vacuum source by way of said flow



connection, said device including means operable to allow entrance of air at atmospheric pressure to said one sub-chamber when said passage is closed and to prevent said air entrance when said passage is open.

4,033,296

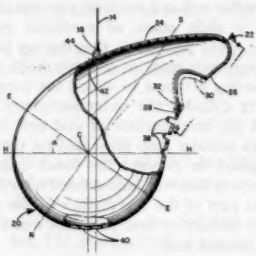
AERODYNAMIC HANGING BIRDHOUSE

Patrick J. Cudmore, 28 Linden Lane, Duxbury, Mass. 02332

Filed Oct. 28, 1975, Ser. No. 626,281

Int. Cl.² A01K 31/00

U.S. Cl. 119—23 15 Claims



1. A birdhouse adapted to be hung from an overhead support comprising:

a. a hollow structure having an asymmetrical teardrop shape including a substantially hemispherical leading portin, and a downwardly drooping, substantially pointed trailing portion having a convex upper side and a substantially concave lower side, when viewed in cross-section;

b. an entry hole formed in said trailing portion lower side;

c. at least one ventilation aperture formed in said trailing portion lower side and located between said entry hole and said leading portion; and

d. means for hanging said birdhouse from an overhead support, said hanging means including a flexible line attachment point located on said trailing portion upper side;

e. the aerodynamic teardrop shape of said hanging hollow structure causing said entry hole to rotate horizontally to the downwind direction in the presence of wind.

4,033,297
PROTECTION OF SUPERHEATER TUBES AGAINST CORROSION

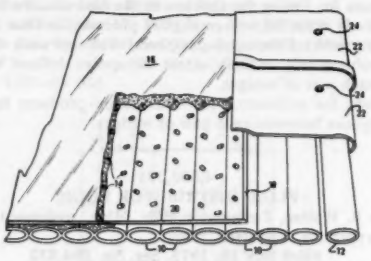
Andre Moreau, Paris, France, assignor to Electricite de France (Service National), Paris, France

Filed Mar. 12, 1976, Ser. No. 666,491

Claims priority, application France, Mar. 28, 1975, 75.09896

Int. Cl.² F22G *3/00*

U.S. Cl. 122—476 **13 Claims**



1. A method of providing a boiler superheater with tubes protected against corrosion comprising the steps of assembling tubes side to side so as to make a panel, coating at least a part of the surface of the panel with a continuous sheet of a refractory lining material which has a satisfactory thermal conductivity and is chemically inert with respect to the products of combustion in the boiler, the lining material including a binder which provides the material with resistance to collapse in the cold state, and then setting the coated panel of tubes inside the superheater at its required position.

5. A panel of tubes for a boiler, the panel comprising a rigidly interconnected set of metal tubes with a continuous sheet of a refractory lining material which has a satisfactory thermal conductivity and is chemically inert with respect to combustion products covering at least a portion of the surface of the set of tubes, the lining material including a binder which provides the sheet with resistance to collapse in the cold state.

4,033,298
BOTTOM SUPPORTED, HOPPER BOTTOM FURNACE FOR PULVERIZED COAL FIRING

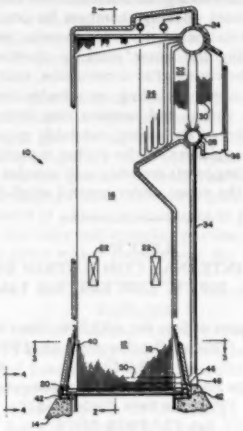
Robert Patton Sullivan, Chattanooga, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed June 23, 1976, Ser. No. 699,107

Int. Cl.² F22B *37/24*

U.S. Cl. 122—510 **3 Claims**

1. A bottom supported steam generator including a furnace means for supplying coal and air to the furnace, water cooled tubes lining all four walls of the furnace, said tubes being welded together so as to form a gas tight structure, a hopper bottom for the furnace, inlet header means below and encircling the hopper bottom, the tubes lining all four walls of the hopper bottom and the rest of the furnace being connected to and supplied with water from the inlet header means, a plurality of structural metal struts extending between the inlet header means and each of the four furnace walls at a level above the hopper bottom, each of the tubes lining the hopper bottom walls containing a bend therein adjacent the struts so as to be flexible enough to prevent excessive thermal and excessive mechanical stresses therein, and each of the tubes



lining all four walls of the furnace above the level of the strut connections extending in a straight vertical line.

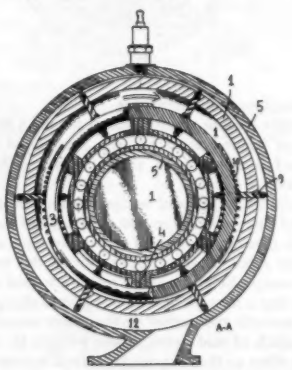
4,033,299
ROTARY ENGINE

Sergio C. Manzoni, 25 Reno Avenue, Hamilton, Ontario, Canada (L8T 2S5)

Filed Jan. 22, 1975, Ser. No. 542,918

Int. Cl.² F02B *53/08*

U.S. Cl. 123—8.43 **2 Claims**



1. A rotary internal combustion engine comprising in combination:

a stationary housing comprising an inner and outer concentric cylinder, assembled in between walls or end plates forming an annular chamber, an annular rotor eccentrically located into said annular chamber forming the inner and outer working chambers, a shaft secured to the rotor on one side and extending through the housing and being fastened in an end plate, a flange embodied to the rotor on the side opposite the shaft, said rotor including radially disposed and movable vanes for continuous engagement with the interior of the casing during rotation of the rotor, said rotor being concentrically mounted on said shaft and eccentrically oriented in relation to the casing for providing expanding and contracting chambers between adjacent vanes during the rotation of the rotor, means interlocking the vanes for restraining them radially inwardly and outwardly against the interior of the casing, said

casing including means admitting a compressible and combustible mixture into the inner chambers, passage means for transferring the mixture from the inner chambers to the outer working chambers for compression and ignition by rotation of the rotor therein, passage means communicating the outer working chambers with the exterior of the casing after combustion, said means interlocking the vanes including an annular ring journalled through the vanes, said annular ring being concentric with the center of the casing, rotatable means journalled on the inner cylinder of the casing including a bearing with connecting joints securing said annular ring, thereby maintaining the vanes under control at all times.

4,033,300
ROTARY INTERNAL COMBUSTION ENGINE

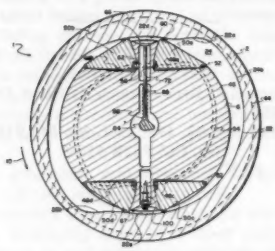
Dallas J. Larson, 2001 S. 2300 East, Salt Lake City, Utah 84108

Continuation-in-part of Ser. No. 633,346, Nov. 19, 1975, Pat. No. 3,986,483. This application Aug. 12, 1976, Ser. No. 713,942

The portion of the term of this patent subsequent to Sept. 7, 1993, has been disclaimed.

Int. Cl.² F02B *55/14*

U.S. Cl. 123—8.45 **16 Claims**



1. A rotary engine comprising

a generally annular stator member having a first and second pair of spaced apart sockets located in the periphery thereof and having a shaft extending from one side thereof;

a first and second pair of wedges each pivotally mounted at one of their vertices on the periphery of the stator member to pivot in and out of respective ones of said sockets as said rotor member rotates about the stator member, said wedges being mounted relative to said stator member such that a base of each wedge pivots along an arc generally towards the center of the stator member, and such that each of said bases of the wedges in each pair face each other so that a space is formed by said bases of each pair of wedges,

a rotor member having side walls and an interior peripheral wall and mounted to rotate about said stator member, said rotor member formed to define a combustion cavity and a compression cavity between the portions of the periphery of the stator member between the bases of the wedges and the interior peripheral wall of the rotor member, said combustion cavity and compression cavity being disposed substantially 180° apart about the periphery of the stator member, said peripheral wall having two innermost portions thereof substantially parallel to the outer periphery of the stator member, said portion extending at least the distance between the bases of the wedges of each pair thereof, and said portions being disposed substantially 180° apart, said portions of the peripheral wall being joined tangentially by two curved portions thereof which each first curve convexly and outwardly away from the stator member and then curves concavely and inwardly toward the stator member,

a cam track defined in at least one side wall of said rotor member,

cam followers extending from at least one side of each wedge and guided by said cam track to cause said wedges to pivot in and out of said sockets and to maintain sliding contact with the interior peripheral wall of said rotor member,

means for introducing a fuel mixture into the spaces between each pair of wedges.

means for igniting the fuel mixture between each pair of wedges,

means for timing the ignition of the fuel mixture to selectively coincide with or slightly precede the time the said portions of the rotor peripheral wall are each disposed substantially entirely across the spaces defined between each pair of wedges,

means for exhausting the combustion products from the spaces between each pair of wedges.

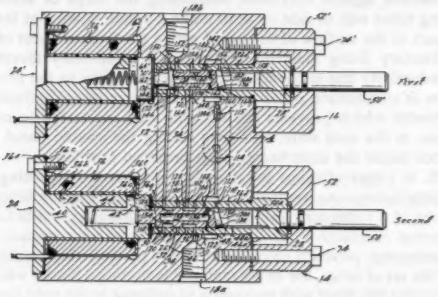
4,033,301
FLUID DISTRIBUTOR LOGIC

Erlen B. Walton, Farmington Hills, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed July 10, 1975, Ser. No. 594,832

Int. Cl.³ F16K *13/04*

U.S. Cl. 123—32 G **22 Claims**



13. A dual metering valve for a pilot fuel injection system of the type including a source of pressurized fuel, a nozzle for delivering the fuel to a piston cylinder of an internal combustion engine, and means for actuating said dual valve in a timed relation to the engine, said dual valve comprising:

housing means having a fuel inlet connected to said source and a fuel outlet connected to said nozzle;

pilot and main valve assemblies disposed in said housing and each including

a valving member movable between first and second positions in response to signals from said actuating means, and

metering means including a metering passage defined by the valving member and movable therewith for metering fluid from said inlet to said outlet when the valving member is moving between said first and second positions, said metering passages blocked from communication with said outlet when the valving member is in said first and second positions; and

logic means for controlling fluid communication between said inlet and the metering passages defined by the pilot and main valving members of said pilot and main valve assemblies, respectively, said logic means including

a first logic passage defined by said pilot valving member and movable therewith, said pilot valving member operative to block communication between said inlet and said metering passage defined by said main valving member when in said first position and communicate said inlet and metering passage via said logic passage when in said second position, and

a second logic passage defined by said main valving mem-

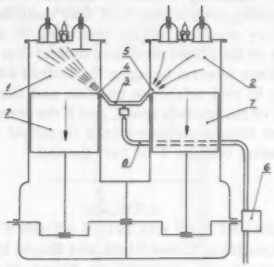
ber and movable therewith, said main valving member operative to communicate said inlet and said metering passage defined by said first valving member via said second logic passage when in said first position and block communication when in said second position.

4,033,302

FOUR-STROKE, MULTICYLINDER, SPARK IGNITION, FUEL INJECTION INTERNAL COMBUSTION ENGINE

Stanislaw Jarnuszkiewicz, Krakow, Poland, assignor to Politechnika Krakowska, Krakow, Poland

Filed June 17, 1975, Ser. No. 587,621
Claims priority, application Poland, June 18, 1974, 172037
Int. Cl.² F02B *75/20*
U.S. Cl. 123—59 BM **8 Claims**



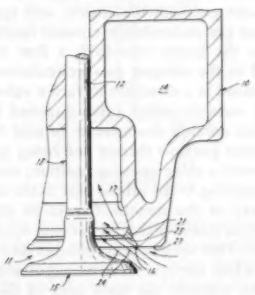
1. In a four-stroke multicylinder internal combustion engine having first and second cylinders defining working space, inlet and outlet valves in said cylinders at the upper ends thereof and respective pistons moving in unison in the cylinders and wherein combustion takes place in alternation in the cylinders at intervals of 360° of crankshaft revolution, the improvement comprising valveless duct means interconnecting the working spaces of the cylinders for flow of exhaust gases between the cylinders, and means for supplying fuel to said duct means such that the fuel is transported with the flow of exhaust gases from one cylinder to the other.

4,033,303

ENGINE EXHAUST VALVE COOLING

Hai Wu, Northville, and Charles M. Jones, Detroit, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 25, 1976, Ser. No. 661,216
Int. Cl.² F01P *3/12*
U.S. Cl. 123—41.85 **6 Claims**



1. A cylinder head having an exhaust valve port comprising a throat defined by a wall of substantially circular cross section,

and a bevelled valve seat circumscribing the wall having an axially extending annular surface thereof adapted to be engaged by a valve head to close the port,

the bevelled valve seat extending outwardly from the axis of the throat at an angle to the wall,

wherein the improvement comprises:

an annular diverter means concentric with the axis of the wall,

the diverter means being constructed and arranged to cause separation from the valve seat surface of high temperature exhaust gas flowing into the exhaust port between the valve head and the valve seat when the port is open,

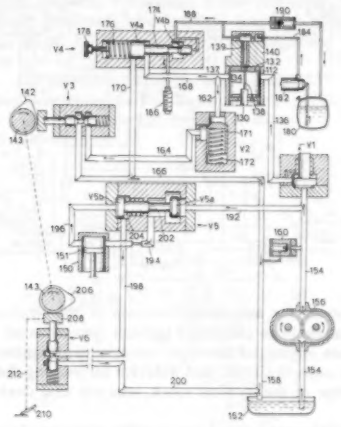
whereby when the gas flow is forced to separate from the seat the resulting film coefficient is lowered and the valve seat operates at a lower temperature to provide a cooling effect on the valve seat engaging portion of the valve head when the latter makes contact with the valve seat.

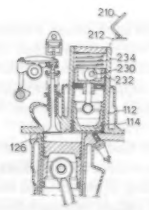
4,033,304

PISTON-TYPE INTERNAL COMBUSTION ENGINE

David Luria, 11 Pelechovsky St., Tel-Aviv, Israel

Filed June 10, 1975, Ser. No. 585,652
Claims priority, application Israel, June 14, 1974, 45039; Apr. 8, 1975, 47050; Apr. 8, 1975, 47051
Int. Cl.² F02B *75/04*; F01L *1/34*
U.S. Cl. 123—78 A **20 Claims**





1. An internal combustion engine operable through induction, compression, expansion and exhaust strokes, comprising: a main cylinder and a main piston movable therein; an auxillary cylinder and an auxillary piston movable therein; the inner ends of the two cylinder being in communication with each other and defining a common chamber with their respective pistons; means including a fuel intake valve for effecting the induction of gases into said common chamber; a control member movable to control the engine output; a variable valve timing device controlling the timing of the intake valve; a coupling between said movable control member and the variable valve timing device effecting a delay in the closing of the intake valve in response to the movement of the control

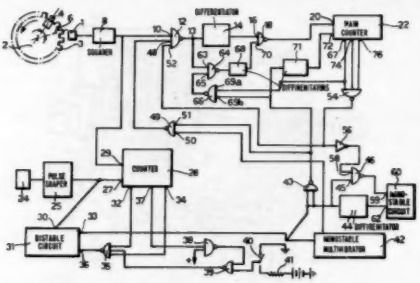
member, which delay is increased when the control member is moved to lower the engine output and decreased when the control member is moved to raise the engine output; said auxillary piston being floatingly displaceable in its auxillary cylinder to increase or decrease the volume of the common chamber; a spring urging the auxillary piston to its innermost position within the auxillary cylinder; and limiting means controlled by said control member and acting on said auxillary piston independently of said spring for limiting the outermost position of the auxillary piston within its auxillary cylinder to increase or decrease the volume of said common chamber in accordance with the engine output so as to provide a substantially constant compression ratio and substantially complete exhaust during all loads.

4,033,305

ELECTRONIC IGNITION SYSTEMS FOR AN INTERNAL COMBUSTION ENGINE

Mauro Maioglio, Turin, and Rafael Jacoel, Milan, both of Italy, assignors to Fiat Societa per Azioni, Turin, Italy

Filed May 10, 1976, Ser. No. 684,820
Claims priority, application Italy, June 25, 1975, 68628/75
Int. Cl.² F02P 5/04
U.S. Cl. 123—117 D **4 Claims**



1. A device for automatic variation of the ignition spark advance angle in an electronic ignition system for an internal combustion engine, of the type comprising an ignition spark discharge control circuit, and a device for varying the instant of discharge of the ignition spark, wherein said device comprises:

reference means located on a rotating member of the engine which turns with the crankshaft, said reference means comprising:

at least one protuberance phase displaced in advance of a position on said rotating member representing the top dead centre position of said crankshaft of said engine by an angle θm equal to the maximum spark advance angle required, said protuberance defining a reference position of said crankshaft, and

a series of teeth on said rotating member,

first pick-up means sensitive to the passage therepast of said teeth on said rotating member and responsive thereto to produce a train of pulses representing the speed of rotation of said rotating member;

first counting means for counting said train of pulses from said first pick-up means during each ignition timing cycle of said engine,

second pick-up means responsive to the passage therepast of said at least one protuberance to produce a pulse indicating said reference position of said crankshaft,

means responsive to the output of said first counting means operating to initiate the ignition spark when said first counting means reach a predetermined count,

first logic gating means connected to the output of said first pick-up means, means connecting the output from said first logic gating means to the input of said first counting means, said first logic gating means selectively permitting the passage of pulses fed thereto to said first counting means,

second counting means for counting the pulses produced by said first pick-up means from the moment when said protuberance passes said second pick-up means indicating that said crankshaft of said engine is at said reference position,

timing circuit means operating to produce a timing signal output a predetermined time T after an input signal has been fed thereto,

logic switching circuit means having a control input connected to the output from said second counting means, the output from said switching circuit means being connected to the input of said timing circuit, means connecting the output of said timing circuit, to a second input of said first logic gating means,

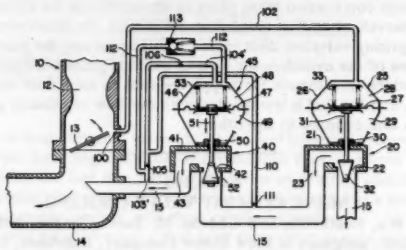
frequency doubling means connected between said first logic gating means and said first counting means, said frequency doubling means operating to double the frequency of the pulses produced by said first pick-up means in the time interval between the instant when said crankshaft is in said reference position and the instant of discharge of the ignition spark, and if the speed of the engine is lower than a predetermined threshold n_1, also during said timing interval T or part thereof.

4,033,306

EXHAUST GAS RECIRCULATION SYSTEM

Sugihara, Kunihiko; Kazuo Hioki, and Shigeo Muranaka, all of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed June 9, 1975, Ser. No. 585,055
Claims priority, application Japan, June 11, 1974, 49-66938
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A **4 Claims**



1. An exhaust gas recirculation system for an internal combustion engine having an intake pipe connected with an intake manifold, a throttle flap in the intake pipe and exhaust pipe to discharge exhaust gas from the engine, said system comprising: and exhaust gas recirculation conduit feeding part of the exhaust gas to the intake manifold; a first variable-orifice valve disposed in the exhaust gas recirculation conduit and being spring-biased in a direction toward a valve closing position; a second variable-orifice valve disposed in the exhaust gas recirculation conduit downstream of said first valve with respect to exhaust gas flow therein and being spring-biased in a direction toward a valve opening position; means defining a vacuum port opening to the intake pipe in the neighbourhood of the preiphery of the throttle flap in its closed position; means defining an intake manifold vacuum sensing port opening to a portion of the recirculation conduit downstream of the second valve; a first vacuum servo means connected with said vacuum port to increase the open area of the first valve in dependence on the increase in vacuum at said vacuum port; a second vacuum servo means connected with said intake manifold vacuum sensing port to decrease the open area of the second valve in dependence on the increase in vacuum in said vacuum sensing port; a first conduit connecting said vacuum

port to said first servo means; a second conduit connecting the intake manifold vacuum sensing port to said vacuum servo means and having two metering orifices formed at the respective end portions thereof; and a third conduit branching off from a portion of the second conduit between the two metering orifices and having a port opening to a portion of the recirculation conduit between the first valve and the second valve.

4,033,307

PROCESS AND DEVICE FOR PREPARING IGNITABLE FUEL MIXTURES

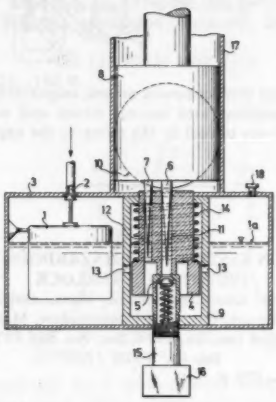
Veit John, Wiesbaden, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

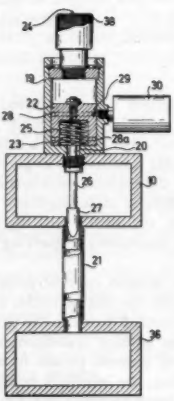
Filed July 8, 1975, Ser. No. 594,129

Claims priority, application Germany, July 10, 1974, 2433061; Oct. 30, 1974, 2451470

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **5 Claims**





1. A device for preparing an ignitable mixture of fuels having different calorific values in internal-combustion engines, comprising a float chamber and a dosing device in the interior of said chamber and immersed in the fuel, the dosing device being provided with at least two bores, nozzle pins above the said bores by means of which the free cross sectional areas of the bores are varied, a piston slidable in the direction of the bores with which the nozzle pins are connected, closing means for at least one bore to shut the bore(s) independent of the variation of the free cross sectional area thereof, and a suction tube into which the bores discharge.

2. The device claimed in claim **1**, in which the suction tube between the piston actuating the nozzle pins and the internal-combustion engine a dosing device for hot gases is mounted, which dosing device is operated in dependency on the load on the engine and comprises an inlet pipe for hot gas and a casing, an element movably mounted in the interior of said casing, the said element being under atmospheric pressure on one side and under the pressure of the suction tube on the other side, a piston rod connected with the said element and protruding into the suction tube and a piston valve at the free end of the piston rod to close the inlet pipe.

4,033,308

EXHAUST GAS RECIRCULATION CONTROL SYSTEM

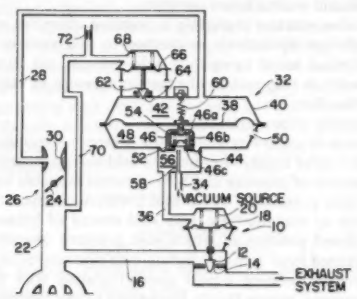
Yoshimasa Hayashi, Yokohama; Yasuo Nakajima, Yokosuka; Kunihiko Sugihara, and Syunichi Aoyama, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed June 19, 1975, Ser. No. 588,237

Claims priority, application Japan, June 24, 1974, 49-72082

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **12 Claims**



1. An exhaust gas recirculation control system for a motor vehicle driven by an internal combustion engine whereby exhaust gas is recirculated to the engine combustion chambers to lower exhaust gas emission of NOx, the system comprising:

a vacuum operated exhaust gas recirculation control valve;

vacuum source means for providing an operating control vacuum to said exhaust gas recirculation control valve during engine operation;

carburetor venturi vacuum means for providing a carburetor venturi vacuum control signal during engine operation;

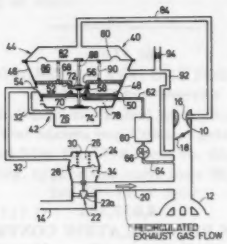
control means responsive to the venturi vacuum control signal and for modulating, in accordance with the venturi vacuum control signal, the operating control vacuum provided to the exhaust gas recirculation control valve by said vacuum source; and

compensating means for venting said venturi vacuum means in accordance with an engine intake vacuum signal generated downstream of the throttle valve of the carburetor, which signal is provided by engine intake vacuum source means, thereby decreasing the magnitude of the venturi vacuum control signal in proportion to the magnitude of the engine intake vacuum signal generated downstream of the throttle valve.

4,033,309
EXHAUST GAS RECIRCULATION SYSTEM WITH CONTROL APPARATUS FOR EXHAUST GAS FLOW CONTROL VALVE

Yoshimasa Hayashi, Yokohama; Yasuo Nakajima, Yokosuka; Kunihiko Sugihara, and Shin-ichi Nagumo, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed June 19, 1975, Ser. No. 588,240
Claims priority, application Japan, June 24, 1974, 49-72084
Int. Cl.² F02M *25/06*
U.S. Cl. 123—119 A **7 Claims**



3. In an internal combustion engine having an intake passage having a venturi and a throttle valve and an exhaust passage, an exhaust gas recirculation system comprising:

a recirculation conduit to recirculate a portion of exhaust gas from the exhaust passage to the intake passage;

an exhaust gas flow control valve to control exhaust gas flow in said recirculation conduit;

a valve actuator including a pressure chamber and a diaphragm operatively connected to said exhaust gas flow control valve to operate said exhaust gas flow control valve in response to changes in pressure in said pressure chamber;

a source of pressure; and

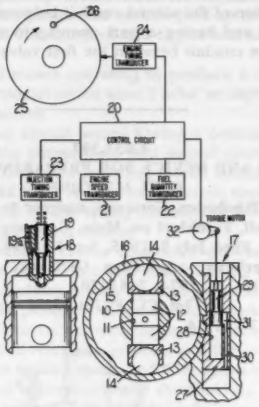
a control apparatus including a pressure responsive regulator valve fluidly intermediate said valve actuator and said source of pressure and having means movable between an open position in which said pressure chamber is permitted to communicate with said source of pressure and a closed position in which said pressure chamber is prevented from communicating with said source of pressure, means defining a port communicating with the intake passage, means fluidly connected to the venturi for moving said regulator valve toward its open position responsive to vacuum at the venturi and means fluidly connected to said port communicating with the intake passage downstream of the throttle valve for moving said regulator valve toward its closed position responsive to vacuum at said port.

4,033,310
FUEL PUMPING APPARATUS WITH TIMING CORRECTION MEANS

Wilfrid Edward Walter Nicolls, East Molesey, England, assignor to C.A.V. Limited, Birmingham, England

Filed Oct. 4, 1973, Ser. No. 403,717
Claims priority, application United Kingdom, Oct. 4, 1972, 45722/72
Int. Cl.² F02M *39/00*
U.S. Cl. 123—139 AP **11 Claims**

1. A liquid fuel pumping apparatus for supplying fuel to an internal combustion engine the apparatus comprising an injection pump adapted to be driven by an associated engine for supplying fuel to at least one injector in timed relationship to the engine, first means for adjusting the quantity of fuel supplied to the engine at each injection stroke of the injection pump, second means operable to adjust the timing of delivery of fuel by the injection pump, third means for providing an electrical signal indicative of the actual instant at which delivery of fuel takes place to the engine, fourth means for supplying a periodic signal indicative of the position of the parts of

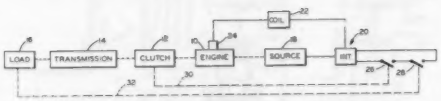


the engine, and control circuit means, responsive to said signals, for controlling said second means and adjusting the timing of delivery of fuel by the pump to the engine.

4,033,311
IGNITION SYSTEM WITH HAZARDOUS-START INHIBITING INTERLOCK

Bob O. Burson, East Longmeadow, Mass., assignor to R. E. Phelon Company, Inc., East Longmeadow, Mass.

Filed Dec. 26, 1974, Ser. No. 536,597
Int. Cl.² F02N *17/00*
U.S. Cl. 123—179 K **10 Claims**



1. An ignition system for an internal combustion engine connected in driving relationship with at least one device having a member movable between a safe position for engine starting and an unsafe position for engine starting comprising:

a spark plug for the internal combustion engine;

an ignition transformer including a low tension primary and a high tension secondary winding connected with the spark plug for producing a sparking potential to fire the plug;

a source of low tension current pulses supplied in timed relationship with the engine cycle; and

an interlock connected between the source and the primary winding of the ignition transformer for controlling the transmission of current pulses from the source to the primary winding, the interlock comprising:

a first circuit path between the source and the primary winding having a first switch operably connected with the movable member and placing the first circuit in a pulse-transmitting condition when the movable member is in the safe position and a non-transmitting condition when the member is in the unsafe position;

a second circuit path parallel with the first path between the source and the primary winding and having a second switch with a control element operable to change the second switch and second circuit path between a nontransmitting condition and a transmitting condition

for the pulses independently of the movable member and the first switch; and

actuating means connected with the first and second circuit paths and with the control element of the second switch and having a pulse sensing circuit including a capacitor receiving and charged by current pulses transmitted by the first and second circuit paths to the primary winding for placing the second switch in the transmitting condition to transmit further pulses to the primary winding and including release means having a resistive means for discharging the capacitor and permitting the second switch to return to the non-transmitting condition in the absence of further current pulses.

4,033,312

CRANKCASE FOR MULTI-CYLINDER RECIPROCABLE PISTON INTERNAL COMBUSTION ENGINES

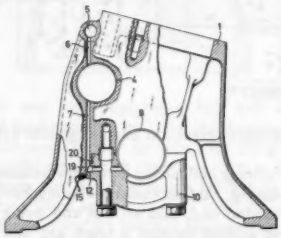
Hans-Ulrich Howe, Kippekausen, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Jan. 16, 1976, Ser. No. 649,854

Claims priority, application Germany, Jan. 17, 1975, 2501772

Int. Cl.² F01M *1/00, 1/04*

U.S. Cl. 123—196 R **9 Claims**



1. A crankcase for a multi-cylinder reciprocable piston internal combustion engine of the single row type which includes: camshaft bearing means, crankshaft bearing means divided along a plane of division and arranged in a suspended manner and provided with cover means detachably connected to said crankcase along mutually abutting surfaces, said cover means and said crankcase being provided with aligned bores, the bore in said crankcase being threaded, screw bolt means extending into said bores and threadedly engaging the respective bore in said crankcase, first lubricant conveying conduit means arranged in the vicinity of said camshaft bearing means and extending in the longitudinal direction of said crankcase, second lubricant conveying conduit means leading from said first lubricant conveying conduit means to said camshaft bearing means, third lubricant conveying conduit means leading from said camshaft bearing means to said crankshaft bearing means, said third lubricant conveying conduit means comprising a plurality of sections respectively located in said crankcase and said cover means while intersecting that portion of said screw bolt receiving bore which is located in said cover means, said third lubricant conveying conduit means leading into said crankcase in the vicinity of said plane of divisions of said crankshaft bearing means.

4,033,313

TOY ELASTIC BAND PROJECTILE-FIRING GUN

James Ryan, 105-24 64th Road, Forest Hills, N.Y. 11375

Filed Jan. 19, 1976, Ser. No. 650,155

Int. Cl.² F41B *7/08*

U.S. Cl. 124—17 **5 Claims**

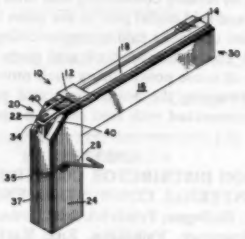
1. A toy elastic band projectile-firing gun comprising:

an elongated barrel having a substantially flat upper surface and a vertical slot in the rear end thereof;

a handle connected to said barrel adjacent the rear end thereof;

an elsstic band connected to the front end of said barrel and stretchable across the upper surface thereof such that the rear end of said band is retained in its cocked position by the rear end of the barrel with the parallel reaches thereof disposed on the upper surface of said barrel;

a wire trigger element mounted pivotally at an intermediate location thereof on the exterior side faces of said handle such that one segment thereof extends forwardly of the handle and terminates in a first transverse section projecting across the front of the handle, another segment of said trigger element extending rearwardly from said intermediate location and having a second transverse section



projecting across the rear of the handle, said second transverse section having integral therewith an unwardly extending section which is bent forwardly at the outer extremity thereof and is dimensioned to be positioned within and to slide within said vertical slot between a first lower position below a level at which the elastic band is retained exteriorly on the rear end of said barrel and a second upper position at which said bent outer extremity of the trigger element engages said elastic band and forces same off the rear end of the barrel, said first and scond transverse sections of said trigger element being engageable with the front and rear portions of said handle to thereby establish the slidable movement limits of said bent outer extremity of the trigger element within said vertical slot.

4,033,314

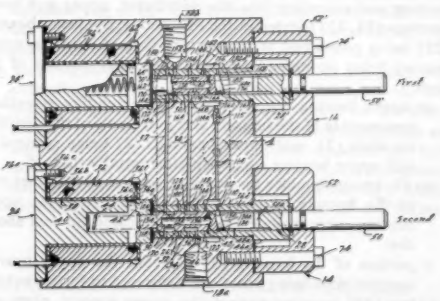
METERING CONTROL

Erlen B. Walton, Farmington Hills, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 8, 1975, Ser. No. 603,078

Int. Cl.² F02M *39/00*

U.S. Cl. 123—139 R **23 Claims**



8. A metering valve for a fuel injection syetem of the type including a source of pressurized fuel, a nozzle for delivering the pressurized fuel to a piston cylinder of an internal combustion engine, means for communicating the source with the nozzle, and distributor means for blocking and unblocking

said communicating means in a timed relation to the cyclic operation of said engine, said metering valve comprising:

a valve housing having a fuel inlet port connected to said source by said communicating means, a fuel outlet port connected to said nozzle by said communicating means, and a fuel return passage;

a valving member moveable in said housing along a path extended from a first position in which it blocks communication between said ports to a second position;

means operative to move said valving member from said first position to said second position at velocities independent of the speed of said engine;

passage means in said valving member operative at some point during movement of said valving member along said path to define a continuous passage through said valve housing by serially connecting said inlet port, said passage means, and said outlet port at the same time said distributor means unblocks said communicating means;

means for connecting one of said ports with said return passage at some point during such movement; and

means for varying the point along said path at which said port is connected with said return passage.

4,033,315

IGNITION DISTRIBUTOR CONSTRUCTION FOR INTERNAL COMBUSTION ENGINES

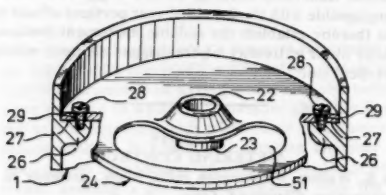
Uwe Kröger, Hofingen; Friedrich Jaki, Erdmannhausen; Hartmut G. Brammer, Vaihingen, Enz; Karl Ehrmann, Stuttgart; Herbert Mägdefrau, Sonthofen; Günter Brand, Stuttgart; Harald Kalippke, Hohenacker, and Rolf Rink, Markgroningen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Oct. 9, 1975, Ser. No. 621,018

Claims priority, application Germany, Oct. 25, 1974, 2450753

Int. Cl.² F02P 7/02

U.S. Cl. 123—146.5 A **12 Claims**



1. Ignition distributor construction for internal combustion engines having a cup-shaped housing (1) having end walls and including a distributor cap (2), a shaft (3) located within the housing and extending into the distributor, upper and lower bearings (21, 22) located in the distributor, the lower bearing (21) being positioned at the bottom thereof, and the upper bearing being positioned adjacent the upper portion of the shaft;

an upper bearing support plate (24) extending essentially transversely of the housing and to the axis of the distributor shaft (3), said upper bearing (22) being secured to said upper bearing support plate centrally thereof;

an abutment shoulder formed by a section of the inner wall of the housing of increased wall thickness, the upper bearing support plate (24) being located on said shoulder;

a portion of the housing (1) adjacent the upper bearing support plate being upset and deformed to form a holding lug (44) pressing against the upper support plate and pressing the upper support plate (24) against the abutment shoulder formed in the housing;

a breaker contact assembly (7) located beneath said plate (24);

and an opening (51) formed in said plate and having a size sufficient to permit passage of the breaker contact assembly through the opening to permit removal of the breaker contact assembly from the distributor housing and replacement thereof without removal or disturbance of said plate from, or with respect to said housing.

4,033,316

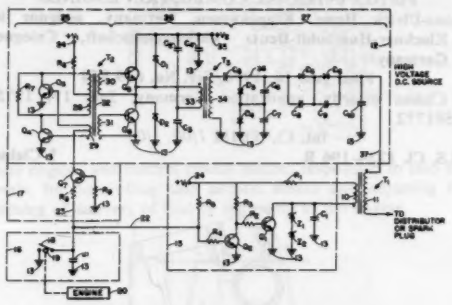
SUSTAINED ARC IGNITION SYSTEM

Arthur G. Birchenough, Brook Park, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed June 3, 1975, Ser. No. 583,485

Int. Cl.² F02P 1/00

U.S. Cl. 123—148 E **17 Claims**



1. An internal combustion engine ignition system comprising:

a step-up voltage coil having a primary winding and a secondary winding, said secondary winding having a first end and a second end, said second end being connected to common ground through a spark gap and which system produces a spark across the spark gap when current through the primary winding is periodically interrupted at controlled times;

means for supplying periodically interrupted current to said primary winding;

a high voltage d-c source connected between said first end of said secondary coil and ground; and

means for activating said high voltage source when current through the primary is switched off but before said spark across the spark gap terminates and for deactivating said high voltage d-c source substantially later than the normal extinguish time of the spark.

4,033,317

INTERNAL COMBUSTION ENGINES

Frank Metcalf Aspin, Knutsford, England, assignor to Aspin Power Limited, England

Filed June 4, 1975, Ser. No. 583,528

Claims priority, application United Kingdom, June 5, 1974, 24865/74

Int. Cl.² F01L 7/00

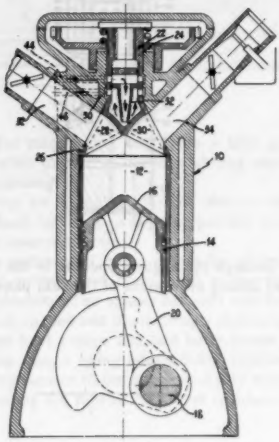
U.S. Cl. 123—190 D **12 Claims**

1. An internal combustion engine comprising:

a structural within which is defined at least one cylinder block accommodating a reciprocable piston having a crown, and within which is disposed a valve rotor mounted at the compression end of the, or each, cylinder for rotation about the longitudinal axis of the cylinder and having a number of valve rotor passages therethrough each extending between the cylinder interior and a portion of the structure having inlet and exhaust ports corresponding in number to the number of valve rotor passages, to allow for conventional four-stroke operation

with said valve rotor rotating at an appropriate fraction of crank-shaft speed, the construction being such that at top dead centre following a compression stroke each valve rotor passage forms a substantially independently enclosed combustion space at the compression end of the cylinder adjacent the crown of the pistion, and

a supply passage leading to and for supplying air only through at least one inlet port, and a supply passage



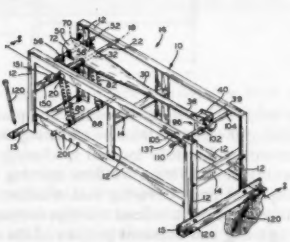
leading to and for supplying a fuel and air mixture through at least one inlet port, the supply passage leading to each inlet port to which air only is fed being inclined so as to direct the air through the valve rotor to the cylinder walls whereas the supply passage leading to each inlet port to which a fuel and air mixture is fed is inclined so as to direct the fuel and air mixture through the valve rotor to the inner part of the cylinder.

4,033,318

SPRING TYPE BALL PITCHING DEVICE

Thomas Raymond O'Grady, 2415 Stanford Ave., Fort Wayne, Ind. 46808

Filed Nov. 7, 1975, Ser. No. 629,692
Int. Cl.² F41B *3/04*
U.S. Cl. 124—7 **10 Claims**



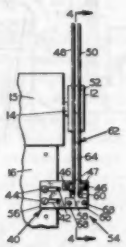
1. A ball-pitching device comprising a rigid box-type frame, an axle serving as a fulcrum transversely mounted in said frame, a bat-shaped throwing arm having the larger diameter end mounted on said axle and comprisng a relatively short driving section and a relatively larger driven section comprised of the smaller diameter bat section and including a ball-holding device at the remote end of such driven section, extendable coil spring driving means disposed on each side of said throwing arm and fastened between a portion of said rigid box-type frame and the driving end of said bat to effect forcible rotation of said throwing arm about its fulcrum in a ball-throwing direction, said throwing arm being rotatable about its fulcrum by said spring driving means in a ball-throwing direction and the relationship between said spring-driving means and said throwing arm being such that throwing arm rotation is limited in its rotational movement only by the re-stretching of said coil spring driving means after the throwing arm has moved beyond a perpendicular position relatively to the longitudinal axis of the machine to obviate a positive stop for said throwing arm, said spring driving means being stretched to the maximum extent when said throwing arm is disposed horizontally with the ball received in said holding device, and locking means for holding said throwing arm in its horizontal firing position against the resistance of said stretched springs, said locking means being movable to a position releasing said throwing arm.

4,033,319

BLADE GUIDE AND SLAB SUPPORT FOR LAPIDARY SAW

Eugene S. Winter, 415 SE. Date St., College Place, Wash. 99324

Filed July 25, 1975, Ser. No. 599,176
Int. Cl.² B28D *1/04*
U.S. Cl. 125—13 R **1 Claim**



1. A blade guide for lapidary saws having dual, parallel, arbor-mounted rotary saw blades, separated by an intermediate arbor, for the cutting of an intermediate slab therebetween, carried by a rigid saw table, the blade guide comprising:

a. a plate having a slot therein arranged to receive freely the peripheral portions of the rotary saw blades,

b. means for mounting the plate on the rigid saw table with the rotary saw blades received freely in the slot,

a first block secured removably to the plate on one side of the slot for sliding engagement with the outer side of one of the saw blades,

d. a second block secured removably to the plate on the opposite side of the slot for lateral adjustment relative to the slot for sliding engagement with the outer side of the other saw blade, and

e. an elongated finger secured removably to the plate and extending inwardly between the saw blades from the outer periphery thereof sufficiently to bear on the intermediate arbor between the saw blades for supporting an intermediate slab cut by and located between the saw blades and to bias the intermediate slab upwardly against the direction of saw rotation, the finger having a width substantially equal to the spacing between the saw blades.

4,033,320

FURNACE AND COLD AIR RETURN SYSTEMS

Gene R. Jury, 125 Ridgeway Drive, Greenwood, Mo. 64034

Division of Ser. No. 488,564, July 15, 1974, Pat. No. 3,926,173. This application Oct. 2, 1975, Ser. No. 618,942
Int. Cl.² F24H *3/00, 3/02*
U.S. Cl. 126—110 R **15 Claims**

1. Apparatus for extracting heat from a heat source exhaust-

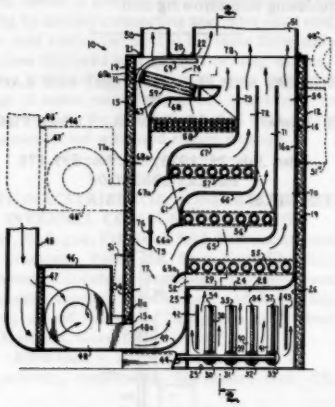
ing heated gases adjacent a forced air circulating heating system, said forced air system having at least one cold air return duct and a hot air circulation duct positioned adjacent one another, comprising, in combination:

a heat extraction chamber positioned at least in part below a length of the hot air duct,

means for passing cold air from the cold air return duct into the lower part of the heat extraction chamber,

means for passing heated air from the upper part of the heat extraction chamber into the hot air circulating duct,

a plurality of sets of heat exchange tubes extending at least substantially across the heat extraction chamber at a plurality of vertically spaced levels therewithin,



means for flowing exhaust gases from the heat source into one end of the lowermost set of heat exchanging tubes,

manifolding means interconnecting the ends of the sets of heat exchange tubes with one another so that

the exhaust gases flow back and forth through the banks of tubes in ascending fashion through the chamber,

means for venting the exhaust gases from one side of the uppermost set of heat exchange tubes,

wall means in said chamber dividing same into a plurality of ducts each of which includes one set of heat exchanging tubes, and

means for exhausting air overhead from said chamber out of said ducts into said hot air circulating duct.

4,033,321

WINDOWED OVEN DOORS

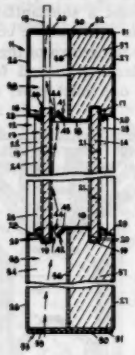
Jacob Krebs, St. Clair Shores, Mich., assignor to Shatterproof Glass Corporation, Detroit, Mich.

Filed Jan. 14, 1976, Ser. No. 649,053

Int. Cl.² F23M 7/04; F24C 15/04

U.S. Cl. 126—198 **9 Claims**

1. In an oven door structure, in combination, spaced front and rear door panels joined together around their perimeters to provide a top wall, a bottom wall and opposite side walls, said door panels being provided with a window opening, spaced outer and inner glass panels mounted in and closing said window opening, the bottom wall of the door being provided with openings to permit cooler air to flow upwardly into the space between the glass panels and the top wall of said door being provided with a relatively narrow elongated opening through which the hotter air, flowing from the space between said glass panels, exits from the door, said narrow elongated opening being vertically spaced from and in alignment with the outer glass panel and dimensional for passage of said panel therethrough, and means for slidably mounting the outer glass panel in the window opening for vertical movement whereby said outer panel can be removed vertically from



the door through the aligned opening in the top wall thereof by upward sliding movement of the said panel.

4,033,322

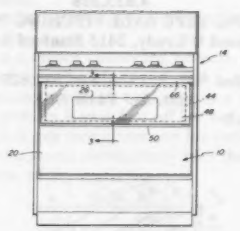
OVEN DOOR STRUCTURE

Harry W. Seidel, Mertztown, Pa., assignor to Raytheon Company, Lexington, Mass.

Filed Jan. 5, 1976, Ser. No. 647,260

Int. Cl.² F23M 7/00; F24C 15/04

U.S. Cl. 126—200 **6 Claims**



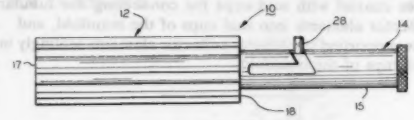
1. An oven comprising a heating compartment having a door opening therein, at least one heating device within the compartment, and a door located in closing relation to said door opening and having a window opening therethrough, a first transparent pane covering said window opening on the inner side of the door, a second transparent pane covering said window opening and adjacent portion of the outer surface of the door and means for supporting said second pane in spaced relation to the adjacent portion of the outer surface of the door and providing a dead air space therebetween and with said first transparent pane said adjacent portion of the outer surface of the door around the window opening being provided with a continuous recess communicating with the space between the panes, said second pane overlying the entire recess in spaced relation with it the outer surface of the door being provided with a continuous raised portion which extends completely around and outwardly of said recess to define a mounting surface generally parallel to said recess, and said second pane being mounted on said raised portion.

4,033,323

HEAT TRANSFER SLEEVE FOR CHEMICAL HEATERS

John H. Trumble, Elm Grove, and Akos Szekely, Colgate, both of Wis., assignors to Thermology, Inc., Milwaukee, Wis.

Filed June 16, 1975, Ser. No. 586,905
Int. Cl.² F24J 1/02
U.S. Cl. 126—263 6 Claims



1. A device for transferring heat from a heat source disposed at the interior thereof to the surrounding environment, said device comprising:

means defining an elongate, hollow thermo-conductive body, said body being open at a first portion for insertion of said heat source therein,

a heat source within said body, means for supporting the heat source within said body, said supporting means defining a plurality of air spaces between said heat source and said body means and comprising a screen interposed between said heat source and said body means, and

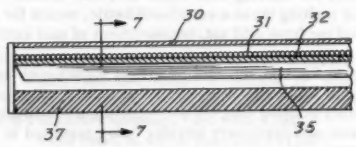
said supporting means being adapted for conducting heat from said heat source to the exterior of said body, said air spaces retarding the rate of such heat conduction.

4,033,324

SOLAR HEAT COLLECTOR

Robert E. Eckels, 2101 Youngfield St., Golden, Colo. 80401

Filed Mar. 10, 1975, Ser. No. 556,807
Int. Cl.² F24J 3/02
U.S. Cl. 126—270 6 Claims



1. In a solar radiation collector utilizing a heat absorbing substrate to absorb heat energy from solar radiation which may then be picked up by a fluid heat transfer medium, the improvement of:

a black heat absorbing, planar substrate;

a focusing member including a plurality of essentially touching, transparent spheres as focusing elements disposed and maintained as a monolayer in a single plane on and contacting said black absorbing substrate to induce a variable focusing effect of solar radiation on said black heat absorbing planar substrate to provide a variable increase of the temperature of impinging solar radiation; and

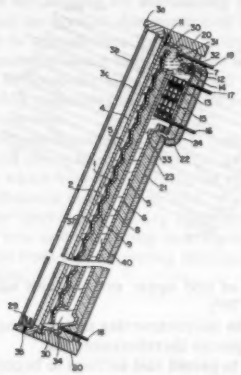
means for securing said spheres in said position on said planar substrate, so as to provide a solar radiation pick up with a variable focus area from each of said spheres transmitted to different portions of the substrate at different times of a day, and thereby produce a net increase of temperature of the substrate at a wide range of angles of incidence of solar radiation.

4,033,325

FLUID SHEET SOLAR COLLECTOR

James Edwin Walker, Rte. 5, Box 150, Charlottesville, Va. 22901

Filed May 11, 1976, Ser. No. 685,258
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 8 Claims



1. A solar energy transformation device for converting solar spectrum radiation to fluid mass heat content by means of an efficient solar spectrum absorber in or on a base material which is not necessarily flat configuration and is not necessarily of high thermal conductivity but is necessarily in intimate thermal contact over its entire surface with a thin collector fluid sheet of ⅜ inch or less average thickness, means for retaining such fluid in sheet form between two material surfaces, one of which may contain the solar spectrum absorber, under the combined actions of body stresses in the materials and of reduced fluid body pressure with respect to ambient pressure such to achieve net compressive and shear stresses in the juncture of the two materials at their edges, means for connecting the collector fluid sheet at top and at bottom through a channel structure to provide continuity of the fluid mass throughout the sheet and the channel structure and to provide facility for fluid mass circulation loopwise throughout the sheet and channel configuration under the thermodynamic influence of fluid material heating in contact with the solar absorber material and/or fluid material cooling in the channel structure, either to produce a net lesser mean density of fluid in the sheet than in the channel at a characteristic vertical elevation, and consequently to effect an upward flow of fluid in the sheet with a corresponding downward flow of fluid in the channel structure, means for incorporating a heat exchanger element in the upper portion of the channel structure, and means for effecting thermal isolation between the fluid sheet and the fluid channel flow patterns and for thermal isolation of the sheet and of the channel from the ambient environment.

4,033,326

INFLATABLE SOLAR COLLECTOR FOR SWIMMING POOL

Lionel J. Leitner, Egbert Hill, Morristown, N.J. 07960

Filed Feb. 23, 1976, Ser. No. 660,331
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 10 Claims

1. An inflatable solar collector for heating a swimming pool comprising:

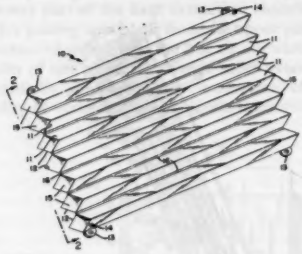
a plurality of individual solar heating sections;

each of said sections having an upper portion which is transparent or translucent and a lower portion having an internal surface which absorbs solar energy, said lower

portion being connected to said upper portion to provide a substantially enclosed intermediate dead air space;

said sections having a major plane which is substantially parallel to the surface of the water in the pool;

when inflated, said upper portions intersecting said plane at at least two locations such that the angles formed by the



intersections of said upper surface with said plane are about 40° to 70°;

a plurality of tabs interconnecting said sections and providing air passageways therebetween; and

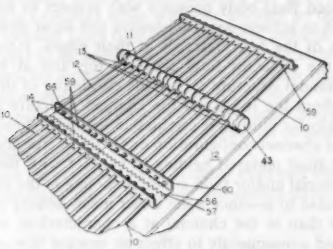
inflating means to permit said sections to become inflatable by gas pressure, said collector when inflated being floatable on the water surface.

4,033,327

SOLAR ENERGY COLLECTOR MODULE SYSTEM

Yu K. Pei, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 24, 1975, Ser. No. 634,714
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 **22 Claims**



1. A solar energy collector module comprising

a plurality of tubular collector elements having the same outside diameter and each including a circumferentially transparent outer tube having a closed end and an open end, and, interiorly of said outer tube, a hollow elongated absorber tube spaced from said outer tube, having a closed end and an open end and including a solar energy absorbing surface disposed between its ends, means annularly sealing the outer tube and the absorber tube together adjacent the open end of one of said tubes to provide a closed space between the two, said space being evacuated to sub-atmospheric pressure, the absorber tube having an interior chamber,

an elongated manifold having lateral, outwardly facing cups for receiving the open ends of said tubular collector elements, each said cup comprising an annular flange at its outer open end, an O-ring gasket, and annular retaining means in said flange for holding said gasket, the gasket forming a fluid seal in the cup encircling said collector elements,

a supply of working fluid,

an inlet header pipe connected to said fluid supply and to at least one of said cups, means interconnecting the cups for flow of fluid through the absorber tubes and between the cups,

an outlet header pipe connected to at least one of said cups for receiving fluid therefrom, and an insulation jacket member of low density cellular material surrounding all of said cups, the interconnecting means therefor and said inlet and outlet header pipes, said jacket including apertures coaxial with said cups for connecting the tubular collector elements into said cups of the manifold, and

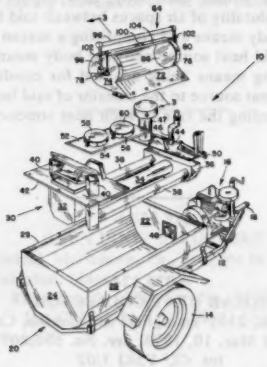
means supporting the tubular collector elements sealingly in said cups of the manifold.

4,033,328

TAR MELTING KETTLE

John H. Lohman, and Richard C. Brooke, both of San Antonio, Tex., assignors to Blackwell Burner Company, San Antonio, Tex.

Filed Nov. 26, 1975, Ser. No. 635,428
Int. Cl.² E01C 19/45
U.S. Cl. 126—343.5 A **12 Claims**



1. A kettle for melting tar, said kettle having a base frame with means for moving said kettle attached thereto, burner means for melting tar in a vat of said kettle, means for removing melted tar from said vat, improvement of said kettle comprising:

lid means for said vat, said lid means sealing with an upper edge of said vat;

stationary housing adapted for receiving a rotating cylinder means, said stationary housing being mounted in said lid means;

pin means in opposing ends of said stationary housing;

rotating cylinder means inside said stationary housing mounted on said pin means inside said stationary housing;

first opening in said stationary housing and a second opening in said rotating cylinder means adapted so that blocks of tar may be inserted through said first opening and said second opening, after rotating said rotating cylinder means via said pin means, said blocks of tar drop through said second opening and a third opening located in said stationary housing into said vat;

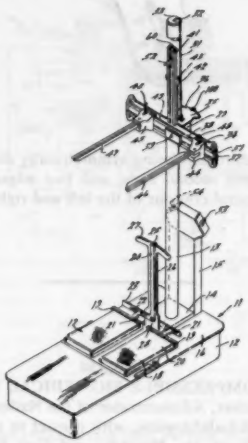
said rotating cylinder means being rotatable by a turning means outside said stationary housing connected to said pin means, upon moving said turning means to a first position said first opening and said second opening are in line to allow insertion of said blocks of tar therethrough into said rotating cylinders, upon moving said turning means to a second position said second opening and said third opening are in line to allow said blocks of tar to drop into said vat;

cover means adapted to cover said first opening rotatably mounted on said stationary housing.

4,033,329
MACHINE FOR DETERMINING VERTEBRAE LOCATIONS IN THE HUMAN BODY

Ralph R. Gregory, and Peter Benesh, both of Monroe, Mich., assignors to National Upper Cervical Chiropractic Research Association, Inc., Monroe, Mich.

Filed May 3, 1976, Ser. No. 682,518
Int. Cl.² A61B 5/10
U.S. Cl. 128—2 S 17 Claims

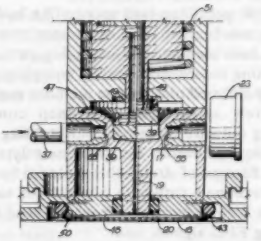


1. In a checking machine for skeletal structure, a base, a top plate for said base, a column extending upwardly from said top plate near one end of the base, a cylindrical sleeve on said column for moving upwardly and downwardly and angularly thereon, a fixed transverse plate on said sleeve for rotation and vertical movement therewith, a cross bar pivotedly secured to said plate forwardly thereof, a pair of slidable housings movable toward and away from each other on said cross bar, and arms secured to said housings and movable angularly from a horizontal plane to indicate tilt and movable laterally of each other to increase or decrease the distance therebetween.

4,033,330
TRANSCUTANEOUS pH MEASURING INSTRUMENT

Barry G. Willis, Palo Alto; Henry A. Schade, Jr., Mount View, and Michael J. Farrell, Woodside, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sept. 8, 1975, Ser. No. 611,387
Int. Cl.² A61B 10/00
U.S. Cl. 128—2 G 7 Claims



1. A device for measuring the concentration of a substance in the blood, said device comprising:

a housing;

optical radiation source means mounted within said housing for providing optical radiation having at least one predetermined frequency component;

detector means mounted within said housing for detecting radiation at said at least one predetermined frequency;

a measuring chamber positioned within said housing in an optical path between said source means and said detector means;

means in the housing for maintaining a volumetric region adjacent an area of skin surface of the body when the device is brought into intimate contact with said area, said means allowing said substance in the blood to pass freely between the skin surface and said volumetric region while preventing the passage of undesired substances therebetween;

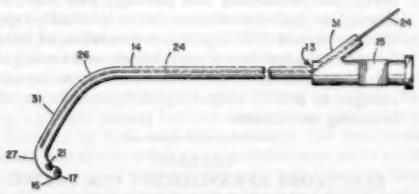
a measuring fluid in said volumetric region, said fluid having radiation absorption characteristics as a function of wavelength which vary as a function of the concentration of said substance in the blood; and

means for drawing measuring fluid from said volumetric region into said measuring chamber and forcing measuring fluid from said measuring chamber into the volumetric region.

4,033,331
CARDIAC CATHETER AND METHOD OF USING SAME

Stephen B. Guss, 30 Jefferson Ave., Morristown, N.J. 07960; Mark R. Goldman, 1 Emerson Place No. 14A, Boston, Mass. 02114, and Leonard M. Zir, 7 Elwin Road, Natick, Mass. 01760

Filed July 17, 1975, Ser. No. 596,644
Int. Cl.² A61M 25/00
U.S. Cl. 128—2 M 8 Claims



1. A coronary catheter comprising:

an elongated flexible tube having a main lumen extending throughout its length and open from the proximal end through the distal end, and having a smaller wire lumen extending from the proximal end to the distal end, the distal end of said wire lumen being closed, said main lumen and said wire lumen being parallel; and

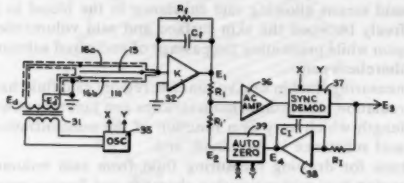
a freely longitudinally movable contour wire residing within said wire lumen of said tube;

a portion of said distal end of said tube being formed with a predetermined deformable curved contour with different degrees of curvature at different distances from said distal end, said distal end assuming one contour curve when said contour wire extends fully to the closed distal end of said wire lumen and assuming a plurality of different complex contour curves when said contour wire is longitudinally moved within said wire lumen to different locations with respect to said closed distal end thereof.

4,033,332
ACTIVITY AND RESPIRATION MONITOR

Edward V. Hardway, Jr., Houston, and William H. Holtman, LaPorte, both of Tex., assignors to Cavitron Corporation, New York, N.Y.

Division of Ser. No. 287,844, Sept. 11, 1972, Pat. No. 3,926,177. This application July 21, 1975, Ser. No. 597,726
Int. Cl.² A61B 5/10
U.S. Cl. 128—2 S **7 Claims**



1. Apparatus for monitoring a condition of the body of a human or animal by sensing the breathing movements of said body, comprising in combination:

a resilient pad for supporting a substantial portion of the weight of said body and including a capacitor having a plurality of electrodes including a driven electrode, a receptor electrode and a dielectric layer of elastomer foam separating said electrodes to permit one of said electrodes to move toward and away from the other electrode to cause relatively long term changes in capacitance between the electrodes in response to activity of the body and relatively short term changes in capacitance between the electrodes in response to said breathing movements; and

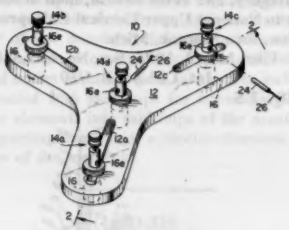
an electronic sensing circuit including (a) means connected to said driven electrode for applying an A.C. drive signal at a frequency that is high enough to be non-hazardous at the voltage levels in use, (b) an amplifier connected to said receptor electrode so that changes in capacitance modulate the output of said amplifier, (c) a demodulator coupled to said amplifier to demodulate the output thereof to produce a fluctuating D.C. signal having fluctuations representative of the changes in capacitance between said electrodes, and (d) high pass filter means coupled to said demodulator for substantially rejecting changes in said D.C. signal representative of relatively long term changes in said capacitance, said sensing circuit being operable to convert said short term capacitance changes to a D.C. output signal representative of said breathing movements.

4,033,333
ELECTRODE ARRANGEMENT FOR TAKING ELECTROCARDIOGRAMS

Ernest J. DeSalvo, Teaneck, N.J., and Marco D. Zarlengo, New York, N.Y., assignors to Combined Scientific Resources Corporation, Teaneck, N.J.

Filed Dec. 10, 1975, Ser. No. 639,368
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.06 E **2 Claims**

1. An electrode arrangement for use in the taking of electrocardiograms comprising a rigid nonconductive plate having three slots extending radially outward from the center thereof; a first electrode post fixed in the center of said plate; second, third and fourth electrode posts each mounted for movement within a respective one of said slots, each of said moveable electrode posts including means for enabling said post to be moved within its respective slot and to be secured in a desired position; all of said electrode posts projecting outwardly from one side of said plate for connection to electrocardiographic machine cables and projecting outwardly from the other side of said plate for contacting the skin of a patient; and means in each of said electrode posts on that part thereof which projects outwardly from said one side of said plate for securing thereto a cable from an electrocardiographic machine; the angle between a first and second slot being in the range

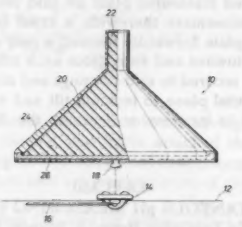


80–100°, the third slot being symmetrically disposed relative to said first and second slots, and two edges of said plate having the general contour of the left and right edges of a Y.

4,033,334
SNAP-IN COMPRESSIBLE BIOMEDICAL ELECTRODE

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; James D. Frost, Jr., Houston, and Carl E. Hillman, Jr., Bellaire, both of Tex.

Filed Dec. 3, 1975, Ser. No. 637,269
Int. Cl.² A61B 5/04
U.S. Cl. 128—2.1 E **6 Claims**



1. A biomedical electrode assembly for use in obtaining EEG signals from a subject comprising:

a resilient sponge-like body;

an electrically conductive plastic base member attached to said sponge-like body, said base member having a generally planar surface;

an electrolyte gel filling said sponge-like body;

electrically conductive snap connector means embedded into said base member and extending outward therefrom;

plastic coating means surrounding completely said sponge-like body and said plastic base member except for an area immediately surrounding said snap connector means extending outward therefrom, said coating means providing a leakproof barrier for said electrolyte gel;

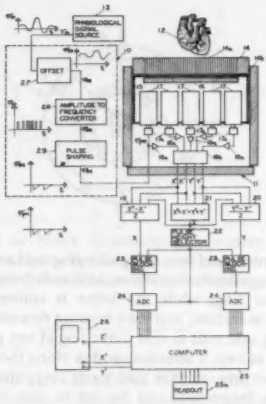
cap means formed of stretchable material for positioning in a predetermined pattern a plurality of said sponge-like bodies at desired locations about the head of a subject for obtaining EEG signals; and

electrically conductive snap connector means attached to said cap means for releasably connecting both electrically and mechanically to one or more of said sponge-like bodies through corresponding snap connector means embedded into said base members thereof.

4,033,335
METHOD AND APPARATUS FOR MULTIPLEXING OF PHYSIOLOGICAL SENSOR SIGNALS WITH GAMMA RAY CAMERA DATA SIGNALS

Robert J. Nickles, Madison, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed June 12, 1975, Ser. No. 586,200
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 R **5 Claims**



2. A device for multiplexing time varying amplitude physiological data signals with the output signals provided by the output circuitry of the photomultiplier tubes of a gamma ray scintillation camera, comprising:

a. amplitude to frequency converter means for receiving a time varying amplitude physiological data signal which does not change in sign and for providing a series of uniformly shaped output pulses, the frequency of said series of output pulses being directly proportional to the amplitude of the physiological data signal;

b. pulse shaping means for receiving said series of output pulses from said amplitude to frequency converter means and for shaping each pulse of said series of pulses to have approximately the same shape as an output pulse provided by the output circuitry of a photomultiplier tube when the photomultiplier tube is struck by light emanating from a gamma ray scintillation; and

c. circuit means for transmitting said shaped pulses from said pulse shaping means to the output circuitry of a photomultiplier tube such that said shaped pulses are combined with the output pulses provided by the output circuitry of the photomultiplier tube.

4,033,336
SYSTEM FOR SENSING AND RECORDING MEDICAL INFORMATION

Frank H. Murawski, Tarpon Springs; James W. Elliott, Seminole; Fred W. Richards, and Gordon L. Johns, both of Clearwater, all of Fla., assignors to Medical Scientific International Corporation, Clearwater, Fla.

Filed Nov. 19, 1975, Ser. No. 633,411
Int. Cl.² A61B *5/00*
U.S. Cl. 128—2.05 R **8 Claims**

1. A system for measuring and recording various characteristics relating to the human body on a magnetic tape cassette, comprising:

an anthropometer for measuring height, weight and girth of the human body;

a blood pressure monitor including a cuff and microphone pickup mounted on said cuff for sensing the sounds produced by pulsations of the blood stream;

an electrocardiogram unit comprising a plurality of input electrodes for connection to the limbs of the human body and a sensing circuit responsive to said output electrodes for providing the standard electrocardiogram leads;

each of said anthropometer, blood pressure monitor and electrocardiogram unit producing analog data signals representative of the various mesurements taken;

a plurality of controls for selectively actuating said anthropometer, blood pressure monitor, and electrocardiogram unit;

control means including a test code generator responsive to actuation of said controls for producing different test code signals corresponding to the various measurements to be performed;

an analog to digital converter for converting said test code signals and said analog data signals into digital code signal and digital data signals, respectively;

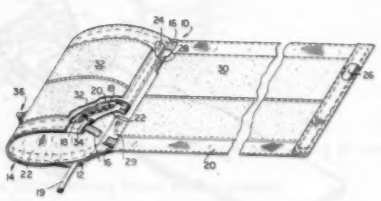
multiplexer means responsive to said test code signals for selectively supplying said analog data signals from said anthropometer, blood pressure monitor and electrocardiogram unit to said analog to digital converter; and

means for recording said digital code signals and said digital data signals produced by said analog to digital converter in a predetermined relationship on a magnetic tape cassette.

4,033,337
SELF-DONNED SPHYGMOMANOMETER CUFF

Jan Raczkowski, Glendale, N.Y., assignor to Propper Manufacturing Company, Inc., Long Island City, N.Y.

Filed Jan. 14, 1976, Ser. No. 648,867
Int. Cl.² A61B *5/02*
U.S. Cl. 128—2.05 C **8 Claims**



1. A sphymomanometer cuff adapted to be applied by a patient on his limb without assistance comprising a cuff body made of a flexible unstretchable sheet material terminating in first and second ends and having a pocket portion adapted to receive an inflatable bladder disposed between said first end and a point intermediate said ends; at least one elastic band having a portion passing between said intermediate point and said first end to form said body between said intermediate point and said first end into an expandable loop, and a portion extending along said body to a fastening point thereon; means for guiding said at least one band with respect to said body so that both portions of said at least one band are stretched when said expandable loop is applied over said limb; and means for removably securing the portion of said body lying between said intermediate point and said second end to said loop to form an unyielding loop.

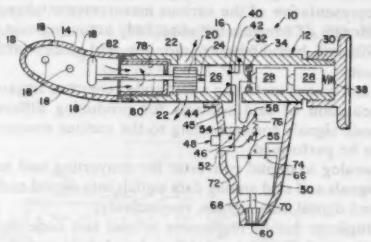
4,033,338
VIBRATORY FEMININE HYGIENE VACUUM DEVICE

Kingsley Igwebike, 4152 Somerset Drive, Los Angeles, Calif. 90008

Filed June 4, 1976, Ser. No. 692,725
Int. Cl.² A61H *1/00*
U.S. Cl. 128—36 **2 Claims**

1. A feminine hygiene vacuum device comprising: a housing including an elongated tubular flexible intake portion for insertion into the vaginal tract; a plurality of spaced-apart intake ports formed in the tubular wall of said intake portion; motor means with said housing; an impeller within said hous-

ing driven by said motor means, said impeller being positioned for setting up a path of air flow radially inward through said



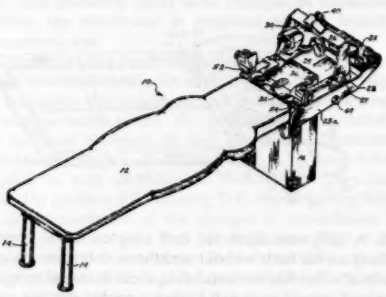
intake ports and longitudinally along the interior of said intake portion; and a collection bag within said housing intermediate said path of air flow.

4,033,339

CERVICAL SIDE POSTURE TABLE HAVING EFFECTIVE HEAD RESTRAINT MEANS

William Powell Roberts, Tampa, Fla., and Gratz Linwood Roberts, Jr., Aedelphi, Md., assignors to said William P. Roberts, by said Gratz L. Roberts

Filed Aug. 12, 1975, Ser. No. 604,030
Int. Cl.² A61F *5/00*
U.S. Cl. 128—68 **30 Claims**



1. In a headrest assembly for use in treating patients, means for contacting the head of a patient and painlessly immobilizing the head against motion during treatment of the patient, one of said means being a contoured mastoid support member providing at least a portion of the support for the head and configured to contact and bear against a lower portion of the mastoid bone, and pressure applying means disposed above the level of said mastoid support member for applying pressure on another portion of the head, to assert force in a direction serving to cause additional pressure on the head against said mastoid support member, thus to effectively minimize unwanted head motion.

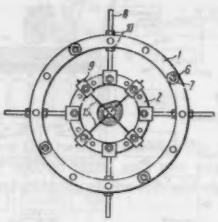
4,033,340

SURGICAL COMPRESSION-DISTRACTION INSTRUMENT

Viktor Konstantinovich Kalnberz, ulitsa Stendera, 13, kv. 2, Riga, U.S.S.R.

Filed Dec. 9, 1974, Ser. No. 531,192
Claims priority, application U.S.S.R., Dec. 14, 1973, 1973053
Int. Cl.² A61F *5/04*
U.S. Cl. 128—92 A **4 Claims**

1. A surgical compression-distraction instrument for treating injuries and diseases of bones and joints, comprising: needles that can be passed through affected bone fragments of a limb to be joined; ring frame means having attachments for immobilizing said needles; longitudinal members interconnecting said ring frame means to form a single frame system about the affected limb; at least one of said ring frame means being formed as a set of two concentric, spaced-apart rings, substantially in the same plane, namely an inner ring and an outer one, capable of withstanding lateral, rotary and angular



tensional forces, said inner ring carrying said needles and rods that radially protrude therefrom, said rods being also fastened to said outer ring, while the latter is connected with said longitudinal members, and load-bearing threaded attachments for fastening said rods to said outer ring at any point along said rods as well as over a selected section along the circumference of said outer ring, so that said inner ring, and hence the affected bone fragments, can be set to any desired position within said outer ring.

4,033,341

SURGICAL DRAPE HAVING IMPROVED RETAINING MEANS

George W. Scrivens, Edison, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Mar. 3, 1976, Ser. No. 663,958
Int. Cl.² A61B *19/06*
U.S. Cl. 128—132 D **28 Claims**

1. A surgical drape comprising a main sheet of flexible, drapable material, said main sheet having an upper surface, a lower surface, a top edge, a bottom edge, and a pair of opposed side edges, said main sheet having secured to its upper surface along a single line of attachment at least one retainer member made from a generally flexible material and comprising an elongated, open-ended conduit through which flexible elements such as suction tubing and the like may be threaded and thereby retained in desired position on the drape.

4,033,342

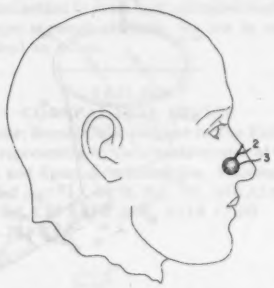
NASAL PROTECTIVE SPLINT

Norman M. Lake, 1705 Newport Drive, Lancaster, Pa. 17602

Filed Sept. 5, 1975, Ser. No. 610,655
Int. Cl.² A61M *16/00*
U.S. Cl. 128—140 N **2 Claims**

1. A new process of employing a particular nasal splint for helping the human nose maintain its mucous membranes in good condition, said splint comprising a U-shaped wire spring for straddling the nose and having two nubs each circular in outline with two convex side faces, each leg of the U-shaped spring being embedded in a different one of the nubs, said nubs being biased towards each other by said spring, said process comprising locating the splint such that the spring of the splint presses the nubs in on the sides of the nose in the

area defined by the portion above the alae and by the upper portion of the alae, this being done to a degree sufficient to trap or minimize inhalation of airborne irritants into the nose,



but insufficient to block breathing and watery secretions therefrom, thus helping the human nose protect against the numerous irritants breathed into the nose during certain seasons of the year.

4,033,343

LUNG VENTILATION EQUIPMENT

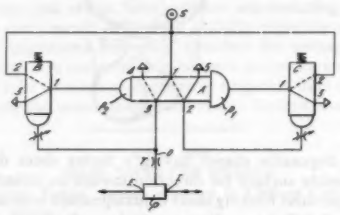
Norman Stewart Jones, Leighton Buzzard, England, assignor to Pneupac Limited, London, England

Filed Nov. 18, 1975, Ser. No. 632,963

Claims priority, application United Kingdom, Nov. 26, 1974, 51251/74

Int. Cl.² A61M *16/00*

U.S. Cl. 128—145.8 **7 Claims**



1. Lung ventilation equipment comprising: an upstream gas pulse source adapted to deliver pulses of breathable gas under pressure at an operating flow rate; downstream patient valve; a line connecting the gas pulse source to the patient valve for delivering the gas pulses from the source to the patient valve; and a sonic-flow restrictor in the line, the restrictor being adjustable for control of the flow rate and having means causing a pressure drop during each breathable gas pulse delivered by the pulse source through the line to the patient valve, the means being arranged to cause the pressure drop predominantly due to choking as a result of sonic flow velocity and negligibly due to resistive impedance, the flow thus being independent of changes in the downstream pressure.

4,033,344

RECOVERY OF CHORIONIC GONADOTROPIC HORMONE FROM PREGNANT MARES

Jack Owen Reed, 1585-B Bergen Blvd., Leonia, N.J. 07605

Filed Apr. 28, 1975, Ser. No. 572,625

Int. Cl.² A61M *5/00*

U.S. Cl. 128—214 R **4 Claims**

1. A method for recovery of chorionic gonadotropic hormone (s) from pregnant mares which comprises:

a. large volume bleeding a pregnant mare;

b. then separating the blood removed from said mare into cellular constituents and plasma;

c. thereafter subjecting the plasma to molecular fractionation separating the plasma into a first plasma fraction containing substances of molecular weight in excess of about 40,000 and a second plasma fraction containing substances of molecular weight less than about 40,000 the last containing the chorionic gonadotropic hormone (s); and

d. returning to the blood stream of the mare the cellular constituents and the first plasma fraction.

4,033,345

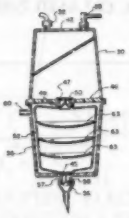
AUTOLOGOUS TRANSFUSION FILTER SYSTEM AND METHOD

James L. Sorenson; Karl A. Pannier, Jr., both of Salt Lake City, and Gordon S. Reynolds, Bountiful, all of Utah, assignors to Sorenson Research Co., Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 631,584, Nov. 13, 1975, which is a continuation-in-part of Ser. No. 580,087, May 22, 1975. This application Jan. 21, 1976, Ser. No. 651,376

Int. Cl.² A61M *1/02, 5/14*

U.S. Cl. 128—214 R **12 Claims**



1. An autologous transfusion system comprising in combination:

means for aspirating blood from a patient;

a first blood-receiving receptacle comprising means connected to the aspirating means for conducting blood from a patient to the interior of the first receptacle, means for imposing a negative pressure within the first receptacle of sufficient magnitude to accommodate aspiration of blood through the aspirating means;

a second blood-receiving receptacle connected to the first by a hollow conduit which communicates the interior of the second receptacle with the interior of the first and means for unidirectionally controlling blood flow from the first to the second receptacle;

means for reducing the fluid pressure in the second receptacle below the fluid pressure in the first receptacle so as to transfer blood from the first receptacle to the second receptacle;

a blood transfer bag communicating witht the second receptacle so that a blood flow path from the second receptacle to the blood transfer bag is formed;

a filter cartridge comprising at least one filter transecting the blood flow path, said cartridge being interposed between the blood transfer bag and the second receptacle; and

means for delivering positive fluid pressure greater than atmospheric to the second receptacle of sufficient magnitude to forcibly expel the blood from the second receptacle through the filter and into the blood transfer bag without interrupting the negative pressure in the first receptacle.

4. An autologous blood transfusion system comprising in combination:

a first rigid blood-receiving receptacle comprising means for receiving blood from a patient and means for impos-

ing a negative pressure within the first receptacle to thereby urge blood from the receiving means to the first receptacle;

a second rigid receptacle, flexible liner normally mounted within the second receptacle and means accommodating unidirectional blood flow from the first receptacle to the interior of the liner, the liner further comprising a blood outlet means through which blood within the liner may be expelled;

at least one filter transecting the flexible liner; and

means for alternately communicating negative and positive fluid pressure between the flexible liner and the rigid receptacle to (1) control the flow of blood into the liner from the first receptacle, and (2) force the blood through the filter and out of the liner through the expelling means.

4,033,346
ADJUSTMENT DEVICE FOR DRENCH GUNS OR SYRINGES

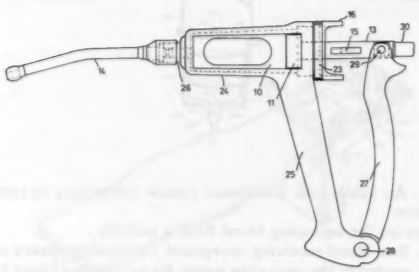
Ian Ross Phillips, Pymble, and Mervyn Frank Reynolds, Dee Why, both of Australia, assignors to N. J. Phillips Pty. Limited, Dee Why, Australia

Filed Aug. 9, 1976, Ser. No. 712,976

Claims priority, application Australia, Aug. 21, 1975, 2874/75

Int. Cl.² A61D *7/00*

U.S. Cl. 128—223 **12 Claims**



1. A drench gun having an interacting bore and piston, a piston rod extending from said piston, and adjustment means to limit the travel of said piston and piston rod to thereby determine either the dosage delivered by or drawn into the gun, said adjustment means comprising a projection extending radially from the peripheral surface of said rod, recessed means rotatable about and located adjacent said rod, a recess in said recessed means extending longitudinally adjacent said rod and dimensioned and positionable to allow said projection to enter into or pass therethrough, whereby said projection when not aligned with said recess limits the travel of the rod in one direction by engagement with said recessed means while when aligned said projection is allowed to travel further in said direction by entering said recess.

4,033,347
DISPOSABLE SYRINGE

Calvin R. Mapp, 1125 NW. 88th St., Miami, Fla. 33150

Filed Apr. 5, 1976, Ser. No. 673,900

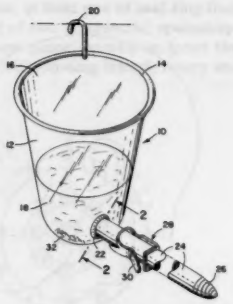
Int. Cl.² A61M *3/00*

U.S. Cl. 128—227 **4 Claims**

1. A disposable syringe comprising:

a ring, collapsible bag, and a u-shaped hook, said ring and said hook being of unitary construction, said bag depending from said ring, said ring forming the mouth of said bag, whereby said bag may be filled with a liquid and hung by said hook from a convenient support, and

a length of flexible hose adapted to be connected to a side wall of said bag and a tubular connector on the sidewall of said bag for receiving said flexible hose, one end of said



flexible hose including a contoured tip for insertion into a body cavity.

4,033,348
DISPOSABLE DIAPER HAVING A TAB FASTENER WITH A BIFURCATED FIXED END

Talivaldis Cepuritis, Kenilworth, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Sept. 16, 1975, Ser. No. 613,778

Int. Cl.² A61F *13/16*

U.S. Cl. 128—287 **11 Claims**

1. A disposable diaper having a facing sheet defining a diaper inside surface for direction toward an infant, a moisture-impervious backing sheet in juxtaposition with said facing sheet and defining a diaper outside surface, an absorbent panel positioned between said facing sheet and said backing sheet, and an adhesive tab fastener means at each side marginal edge of the diaper and which comprises:

a unitary elongated tape segment attached to said diaper at a marginal location thereof, having a free working end and a bifurcated fixed end including first and second anchoring legs which are unitary continuations of said working end and which merge together into said working end at a fixed location, opposing faces of said first and second anchoring legs being provided with an adhesive coating; and

a pressure-sensitive adhesive coating covering a discrete area of one face of said free end adjacent the terminus thereof and in spaced relationship outwardly of said fixed location to provide an adhesive free region therebetween; and

release means cooperating with said adhesive coating on said free end and one of said anchoring legs for releaseably retaining said free end in a storage position disposed inwardly of the side marginal edge of the diaper;

said bifurcated fixed end receiving a marginal portion of said diaper between said anchoring legs, said first anchoring leg being permanently attached to said diaper inside surface by the adhesive coating on said first anchoring leg and said second anchoring leg being permanently at-

tached to said diaper outside surface by the adhesive coating on said second anchoring leg;

said adhesive free region on said one face of said free end being unattached to the adjacent surface of said one anchoring leg, whereby said free end is separable from said release means to make said adhesive coating free end of said tape segment available for use in securing said diaper about an infant.

4,033,349

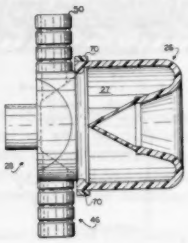
CORNEAL SEAL DEVICE

Edward F. Baehr, Berea, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 13, 1976, Ser. No. 676,433

Int. Cl.² A61F *9/00*; A61B *17/00*

U.S. Cl. 128—303 R **9 Claims**



1. A corneal seal device for assisting in eye surgery, said device comprising:

a tube member adapted to be introduced into the eye and defining an entry passageway for a surgical tool; and

means defining a seal chamber in fluid communication with the one end of said tube member and including sealable tool entry means therein for sealably engaging a surgical tool introduced into said chamber for passage therethrough into said tube member, and means for connecting said tube member to a source of irrigation fluid for maintaining the intraocular pressure at a desired level.

4,033,350

HAIR TWEEZER DEVICE

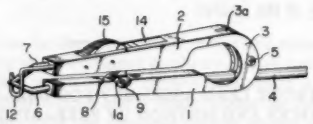
Sadao Hoshi, Tokyo, Japan, assignor to Chitose Corporation, Tokyo, Japan

Filed Sept. 18, 1975, Ser. No. 614,743

Claims priority, application Japan, June 10, 1975, 50-69060

Int. Cl.² A61N *3/04*; A61B *17/30*

U.S. Cl. 128—303.13 **1 Claim**



1. A hair tweezer device comprising:

a. a main body substantially in the form of a letter U and including two elongated legs and a curved portion, said curved portion being slightly flexible;

b. a high frequency wave conductor introduced into one of said legs of said main body;

c. a pair of hair clamping members each extending axially forward from a forward end of one of said legs, said hair clamping members being disposed in a spaced juxtaposed relationship and including tips adapted to be brought into and out of engagement with each other, said hair clamping members being connected to said high frequency wave conductor;

d. a safety guide movably arranged in one of said legs of the main body and extending axially forward and outward from said leg thereof, said safety guide including a bent forward portion adapted to move forward and rearward relative to the tips of the hair of clamping members;

e. a setting lever mounted in one of said legs and partially exposed to the outside; and

f. a link mechanism operatively connected to said setting lever and mounted in said two legs, said link mechanism including a setting link and adapted to be rendered operative, upon actuation of said setting lever, to move the setting link in pivotal motion to thereby cause said safety guide to project forward a greater distance from the forward end of the leg than the tips of said hair clamping members, said link mechanism also being operative to bring the tips of the hair clamping members into and out of engagement with each other by utilizing the flexibility of the curved portion of the main body to clamp a hair and hold the same for a predetermined time interval, whereby the hair can be plucked out by the action of high frequency waves while avoiding direct contact on the tips of the hair clamping members with the skin by means of the safety guide.

4,033,351

BIPOLAR CUTTING ELECTRODE FOR HIGH-FREQUENCY SURGERY

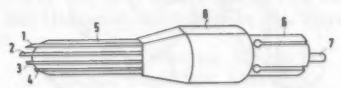
Gert Hetzel, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 570,792, April 23, 1975, abandoned. This application Sept. 14, 1976, Ser. No. 723,170

Claims priority, application Germany, June 14, 1974, 2428886

Int. Cl.² A61B *17/36*

U.S. Cl. 128—303.14 **2 Claims**

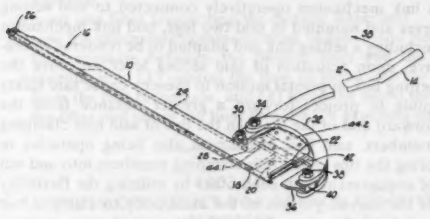


1. In a bipolar cutting electrode for high-frequency surgery, including a source of high frequency voltage, a plurality in excess of two, of mutually insulated, high-frequency voltage-conductive metallic tip potions in fixed spacing relative to each other, means for connecting said tip portions to said source of high frequency voltage, said metallic tip portions comprising ground ends of wire-shaped elements, an insulating member having a tip, said metallic tip portions being inserted into the tip of said insulating member so that the ground ends project therefrom forming the cutting zone of the electrode; the improvement comprising: said insulating member being substantially flat in the region of the cutting zone, said metallic tip portions being displaced relative to each other in the longitudinal direction of said electrode at the tip of said flat insulating member in a row along an arc, said cutting electrode being able to leave thereby a substantially smooth cut in a relatively narrow cavity of a body whereby a high frequency contact between at least two metallic tip portions is always maintained under an inclined holding of the cutting electrode.

4,033,352
CASTRATING DEVICE

Jacob Hellmuth van Reenen, Private Bag 20, P.O. Headlands, Rhodesia

Filed Sept. 29, 1975, Ser. No. 617,866
Claims priority, application Rhodesia, Sept. 30, 1974, 386
Int. Cl.² A61D 1/06; A61B 17/00
U.S. Cl. 128—306 10 Claims



1. In a castrating device which has two jaw plates and two arms, the two arms being pivotally moveable with respect to each other and comprising means for moving the jaw plates rectilinearly so that they may be separated from each other or brought to a closed position in which they are substantially in contact with each other over virtually their entire respective lengths the improvement wherein:

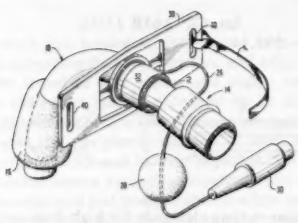
a. The relative movement of the jaw plates is along a straight path and

b. wear-compensating means is operatively connected to at least one jaw plate to adjust any pressure between the jaw plates when the latter are in the closed position.

4,033,353
TRACHEOSTOMY TUBE

John La Rosa, Warwick, N.Y., assignor to International Paper Company, New York, N.Y.

Filed Oct. 16, 1975, Ser. No. 623,115
Int. Cl.² A61M 16/00, 25/02
U.S. Cl. 128—351 38 Claims



1. A tracheostomy tube comprising:

an outer cannula for insertion into a trachea, said outer cannula having interior and exterior extremities, said exterior extremity of said outer cannula having means for connection to a respirator;

an inner cannula disposed to fit removably within said outer cannula, said inner cannula having interior and exterior extermities;

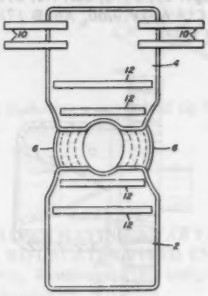
means for preventing significant gas flow between said inner and outer cannulae; and

an adaptive member having an interior nutating connection to said inner cannula, said adaptive member also including at its inner end means for connection to said exterior extremity of said outer cannula and at its outer end means for connection to a respirator, said nutating connection comprising an exterior annular groove on the exterior extremity of said inner cannula and an interior annular ridge within said adaptive member, said ridge fitting within said groove and connecting said inner cannula to said adaptive member while allowing limited movement therebetween, the width of said groove being significantly greater than the width of said ridge and the inside diameter of said groove being significantly less than the diameter of the inner surface of said annular ridge.

4,033,354
COOLING GARMENT

Maria I. De Rosa, 1928 Strawbridge Drive, Library, Pa. 15129

Filed Dec. 5, 1975, Ser. No. 595,238
Int. Cl.² A61N 5/00
U.S. Cl. 128—379 10 Claims



1. A vest-like garment for cooling the body of the wearer, comprising:

an insulated front panel;

an insulated rear body panel;

shoulder straps connecting the top of the front body panel to the top of the rear body panel;

first matable strip fasteners secured to the sides of the front body panel;

second matable strip fasteners, releasably attachable to the first matable strip fasteners, secured to the sides of the rear body panel, such that when the first matable strip fasteners are secured to the second matable strip fasteners, the garment is secured to the body of the wearer;

third matable strip fasteners attached to the inside of the front and rear body panels;

a plurality of sealed waterproof bags filled with water;

fourth matable strip fasteners, releasably attachable to the third matable strip fasteners, each of said fourth matable strip fasteners being secured to a plurality of the sealed waterproof bags, such that, when the sealed waterproof bags are frozen and releasably secured to the inside of the garment by securing the fourth matable strip fasteners to the third matable strip fasteners, the garment cools the body of the wearer.

4,033,355
ELECTRODE LEAD ASSEMBLY FOR IMPLANTABLE DEVICES AND METHOD OF PREPARING SAME

David Charles Amundson, Minneapolis, Minn., assignor to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed Nov. 28, 1975, Ser. No. 635,909
Int. Cl.² A61N 1/00
U.S. Cl. 128—404 6 Claims

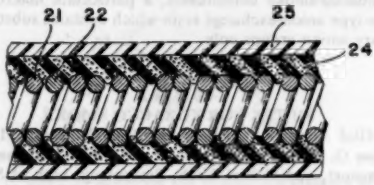
1. In an implantable electrode lead assembly for coupling an electrical stimulator pulse generator to an electrode tip means in contact with an internal organ to be stimulated, said electrode lead assembly comprising:

a. conductor means encapsulated generally coaxially within a flexible cylindrical sleeve means and with said conductor means and said sleeve extending continuously between said pulse generator and said electrode tip means,

said conductor means defining a conductive path from said pulse generator to said electrode tip means;

b. said conductor means including a coiled electrical conductor would generally helically about a central axis and having a generally uniform outer diameter;

c. said flexible cylindrical sleeve means comprising first and second coaxially disposed tubular elements enclosing said coiled conductor means and encapsulating said conductor means therewithin, with the inner diameter of said first tubular element being less than the outer diameter of



said coiled conductor and compressively gripping the outer diameter of said conductor and with the inner diameter of said second tubular element being less than the outer diameter of said first tubular element and compressively gripping the outer diameter of said first tubular element;

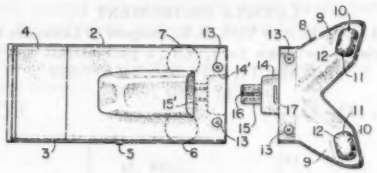
d. said first tubular element comprising a semi-conductive silicone rubber having a resistivity of below about 130 ohm-cm., with said second tubular element comprising an electrically insulating silicone rubber.

4,033,356

APPARATUS FOR THERAPEUTICAL TREATMENT AND STIMULATION OF MUSCLES BY LOW-FREQUENCY OSCILLATING ELECTRIC CURRENT

Takaaki Hara, Tokyo, Japan, assignor to Hakuju Institute for Health Science Co., Ltd., Japan

Filed Aug. 20, 1975, Ser. No. 606,091
Int. Cl.² A61N 1/04
U.S. Cl. 128—405 **3 Claims**



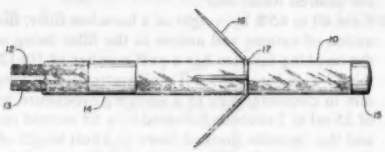
1. Apparatus for therapeutical treatment and stimulation of muscles using a low-frequency oscillator circuit, said apparatus comprising a hand-held housing containing a low-frequency oscillator circuit and a power source for said circuit comprising dry cells, an electrode section having two electrodes separated from each other, and a plug for detachably connecting said electrode section to the housing so as to complete an electrical connection between said electrodes and said oscillator circuit so that, in use of said apparatus, electric current is applied to the muscles of the human body so as to remedy pain and fatigue and strengthen the muscles by stimulation, said housing having a plug receptacle into which the plug of the electrode section is fitted, said electrode section including first and second outwardly extending arms arranged in a V-shaped configuration and forming an oblique angle with respect to said housing, each of said arms containing an electrode at the end thereof, each said electrode comprising a bowl-shaped sheet of metal and a sponge member of a shape conforming to the outer configuration of said bowl-shaped sheet adhesively secured thereto.

4,033,357

NON-FIBROSING CARDIAC ELECTRODE

John R. Heliand, and Kenneth B. Stokes, both of Minneapolis, Minn., assignors to Medtronic, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 547,822, Feb. 7, 1975, abandoned. This application Feb. 17, 1976, Ser. No. 658,355
Int. Cl.² A61N 1/04
U.S. Cl. 128—418 **11 Claims**



1. A non-fibrosing low stimulation threshold lead assembly for permanent implantation in an animal body comprising:

a. at least one electrode formed from conductive material with at least the body tissue exposed surface thereof formed from a non-thrombogenic material; and

b. a conductive lead connected to said at least one electrode; and,

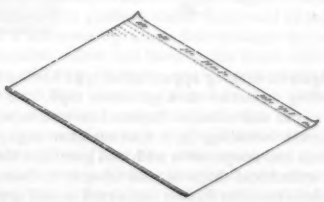
c. encapsulating means with tissue contacting surfaces formed from a non-thrombogenic insulating material, said encapsulating means covering said conductive lead and the connection of said conductive lead to said at least one electrode while leaving a portion of the exposed surface of said at least one electrode exposed for contact with body tissue to be stimulated.

4,033,358

INTEGRAL CIGARETTE PAPER HOLDER ELEMENT

Duane Earl Harrington, 26843 Calaroga Ave., Hayward, Calif. 94545

Filed Apr. 6, 1976, Ser. No. 674,213
Int. Cl.² A24D 1/08; A24F 9/14
U.S. Cl. 131—15 R **7 Claims**



1. A cigarette paper with an integral cigarette holder comprising a thin paper material having a substantially noncombustible, thin, elongated support element integrally secured to said paper, said element being longitudinally arranged along the length of a cigarette rolled with said paper, said element being exposed in part on consumption of the cigarette by smoking, wherein said exposed part comprises a holder means for support of the cigarette.

4,033,359

SMOKING MIXTURE

James Borthwick, Glasgow, and James Forrester Morman, Troon, both of Scotland, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 125,809, March 18, 1971, abandoned. This application Mar. 5, 1974, Ser. No. 448,356

Claims priority, application United Kingdom, Mar. 23, 1970, 13866/70

The portion of the term of this patent subsequent to May 27, 1992, has been disclaimed.

Int. Cl.² A24B *3/14*

U.S. Cl. 131—17 AC 11 Claims

1. A smoking mixture in fabricated form comprising

a. 15–60% by weight of tobacco, based on the weight of said mixture,

b. binder in amount sufficient to fabricate this mixture into the desired form, and

c. from 40 to 65% by weight of a harmless filler, the combination of cations and anions in the filler being such that the smoking mixture has a puff number of 10–12. determined by subjecting a 1.1 g cigarette 70 mm long and 25 mm in circumference to a smoking procedure with puffs of 25 ml in 2 seconds followed by a 58 second rest period and the cigarette smoked down to a butt length of 20 mm, the anion of the filler being formate, oxalate, citrate, tartrate, silicate, carbonate, chloride, sulphate, phosphate, borate, oxide, dioxide or aluminate and the cation of the filler being sodium, potassium, calcium, magnesium, iron or titanium.

4,033,360

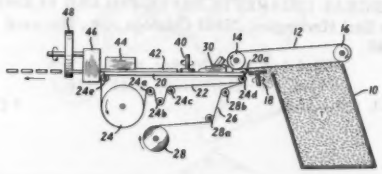
APPARATUS PROVIDING OUTPUT INDICATION OF TOBACCO ROD FIRMNESS

John F. Nienow; Charles T. Higgins, and Leo F. Meyer, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Dec. 5, 1975, Ser. No. 638,080

Int. Cl.² A24B *7/14*; A24C *5/32*

U.S. Cl. 131—21 B 11 Claims



1. In cigarette making apparatus of type having a garniture for imparting curvature to a garniture tape, and thereby to cigarette paper and tobacco disposed on said tape, and short tongue means including (a) a foot member engageable with said tobacco and cooperative with said garniture for imparting generally cylindrical shape to said tobacco to form a tobacco rod (b) a base member fixedly supported in said apparatus and (c) an elongate beam member fixedly secured at one end thereof to said base member, said one end being thereby restrained against movement, and supporting said foot member at the other end thereof for movements according with change in firmness of said tobacco rod, the improvement comprising first and second strain gage means supported on respective opposed sides of said beam member in such locations that said first strain gage exhibits stress change of sense opposite to the stress change exhibited by said second strain gage means on such movement of said foot member.

4,033,361

TOBACCO-SMOKE FILTERS

Henry George Horsewell, Totton, and Ian Richard Harris, Alton, both of England, assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed June 11, 1975, Ser. No. 585,983

Claims priority, application United Kingdom, June 17, 1974, 26780/74

Int. Cl.² A24D *1/06*

U.S. Cl. 131—262 A 12 Claims

1. A tobacco-smoke filter containing, as adsorbent for volatile tobacco-smoke constituents, a particulate macroporous amine-type anion-exchange resin which contains substantially primary amino groups only.

4,033,362

FILTER FOR TOBACCO SMOKE

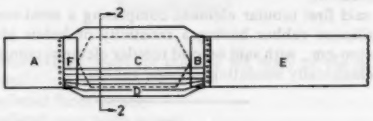
Sven-Olof Almqvist, Saltsjobaden; Curt R. Enzell, Lidingo; Lasse O. Hjern, Vallentuna, all of Sweden; Antoine Artho, Boncourt, and Robert Koch, Porrentruy, both of Switzerland, assignors to Svenska Tobaks AB, Stockholm, Sweden and F.J. Burrus & Cie, Boncourt, Switzerland

Filed Feb. 26, 1975, Ser. No. 553,309

Claims priority, application Sweden, Mar. 13, 1974, 74033473

Int. Cl.² A24D *1/04*

U.S. Cl. 131—264 2 Claims



1. Filter for tobacco smoke, comprising a diffusion portion consisting of a membrane separating the smoke stream from the outer air and being permeable to low molecular compounds in the gaseous phase of the smoke for selective removal of low molecular compounds from said tobacco smoke to the surrounding air.

4,033,363

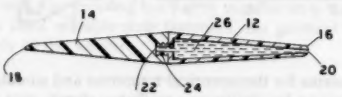
CUTICLE INSTRUMENT

Robert LaCourte, New York, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Apr. 14, 1976, Ser. No. 677,010

Int. Cl.² A45D *29/16*

U.S. Cl. 132—73.5 2 Claims



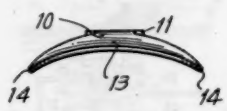
1. A cuticle instrument for applying a compound to soften a cuticle and for moving cuticles towards the base of a nail comprising a hand-held stick-like instrument having a first section and a second section, said first section terminating in a first bevelled edge and said second section terminating in a second bevelled edge, said first and second bevelled edges being adapted to engage a cuticle, said first section comprising a flexible reservoir having a discharge opening at said first edge and a filler opening at the opposite end thereof, said reservoir being squeezeable between the fingers to discharge a cuticle softening compound through said discharge opening and for retrieving an excessive application of cuticle softening compound by relaxing finger pressure applied to said flexible reservoir, said filler opening having thread means thereon, said second section having thread receiving means at the end

thereof opposite said second edge, said thread receiving means being adapted to threadably engage said thread means.

4,033,364
EYE MAKE-UP SHIELD

Margaret Inzana, 274 Logan Ave., Bronx, N.Y. 10465, and Joann Terrett, 3260 Cruger Ave., Bronx, N.Y. 10467

Filed Aug. 13, 1975, Ser. No. 599,513
Int. Cl.² A45D *40/30*
U.S. Cl. 132—88.5 **6 Claims**



1. An eye make-up shield for use in applying mascara to the eyelashes, said shield comprising a handle portion and connected thereto, an eyelid covering portion, said eyelid covering portion simultaneously having a crescent-like shape generally conforming to the shape of a human eyelid and a curvature generally conforming to the curvature of a human eyelid, whereby to enable a user to substantially completely shield her eyelid while leaving her eyelashes exposed when positioning the shield on said eyelid with one hand and to apply mascara to said exposed eyelashes with a separate mascara applicator with the other hand.

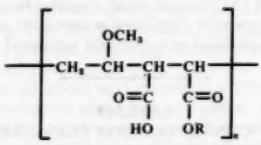
4,033,365
FLAVORED DENTAL ARTICLES

Philip B. Klepak, Bloomsbury; David I. Richardson, Somerset, and Robert G. Fourman, East Brunswick, all of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Jan. 23, 1976, Ser. No. 651,766
Int. Cl.² A61C *15/00*
U.S. Cl. 132—89 **12 Claims**

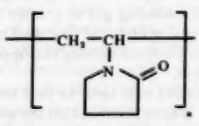
1. A stabilized flavored article for cleaning the teeth comprising a plurality of filaments of a substrate material formed into a larger thread of a sufficiently small diameter to permit insertion between the teeth, said thread impregnated with a polymeric coating containing spray-dried flavor particles, wherein the polymeric coating is selected from the group consisting of

a. alkyl monoesters of poly(methyl vinyl ether/maleic acid) of the formula:



wherein R is an alkyl group containing from 1 to 4 carbon atoms or hydrogen and wherein *n* is from about 3000 to 3400;

b. polyvinyl pyrrolidones of the formula:



wherein *n* is from about 100 to 360;

c. acrylamide/acrylate/butylaminoethyl methacrylate polymers;

d. vinyl acetate/crotonic acid/vinyl neodecanoate terpolymers;

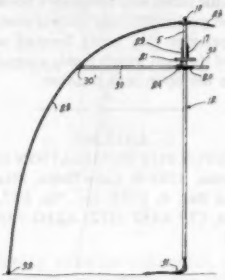
e. vinyl acetate/crotonic acid copolymers; and

f. terpolyamides comprised of the copolymerization products of dicarboxylic acid-diamine reaction product, a second but dissimilar dicarboxylic acid-diamine reaction product and a lactam wherein said terpolyamides have a molecular weight of from about 12000 to about 24000.

4,033,366
UMBRELLA TENT

Léonel Forget, 161 Scott St., St. Jerome, Quebec, Canada

Filed Feb. 5, 1976, Ser. No. 655,379
Claims priority, application Canada, May 20, 1975, 227293
Int. Cl.² A45F *1/04, 1/16*
U.S. Cl. 135—2 **1 Claim**



1. An umbrella tent having a height that permits a person to stand upright inside the erected tent comprising a central post defining an upper end and a lower end, resilient one-piece ribs radially mounted around the central post and pivotally connected at their upper ends to the upper end of the central post for movement of each rib in a respective plane substantially coplanar with said post, a flexible tent cloth laid over said ribs and having a central portion attached to the upper end of said post and a peripheral portion attached to the lower ends of said ribs, a first ring surrounding the central post and slidable along the latter, rigid rods, equal in number to the number of ribs, radially projecting endwise around said first ring, and each defining an inner end pivotally connected to said first ring and an outer end pivotally connected to an intermediate portion of a respective one of said ribs, a post extension post and coaxial therewith and having an outside diameter substantially equal to the outside diameter of said central post, said first ring slidable along said central post and along said post extension during opening and closing movements of said tents, between an uppermost position at the lower end of said central post and a lowermost position intermediate the ends of said post extension, a foot-rest fixed to the lower end of said post extension and engageable by one's foot for opening the tent by downward foot pressure exerted thereon while one's hands prevent downward movement of said first ring to thereby cause downward movement of said post extension and central post through said first ring and consequent spreading of said ribs to open-tent position, a locking device mounted on said central post near the lower end thereof and releasably holding said first ring in its uppermost position at the lower end of said central post with said rods and ribs outwardly pivoted to open-tent position, thereby allowing removal of the post extension cleared by the first ring, said ribs, in open-tent position, being maintained in a convex arc-shaped by the outward thrust of said rods on said intermediate portions of said ribs and the inward restraining force of said tent cloth exerted on the lower outer ends of said ribs, said ribs in open-tent position having a length to extend down and rest on the ground and said post extension, when fitted to said central

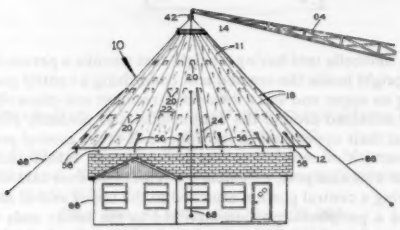
post, terminating above ground level, and further including a spreader ring slidably mounted on said central post and said post extension, overlying said first ring and independent of the same, and spreading ring having a larger effective diameter than that of said first ring and taking a position just above said first ring in the open-tent position with said rods in substantially horizontal position underneath said spreader ring, movement of said first ring downwardly along said central post and said post extension to collapse the tent allowing downward sliding movement of said spreader ring along said central post and said post extension until said spreader ring is engaged by said rods, so that said spreader ring takes, in the fully collapsed position of said tent, an intermediate position along said post extension wherein it is spaced well above said first ring and forms an inward abutment for said rods to maintain said rods in a limit collapsed position wherein they are upwardly and outwardly inclined from said first ring to facilitate subsequent opening of said tent, said locking device comprises an elongated hook member having one end attached to the central post and the other end releasably hooking the first ring in said uppermost position to said central post in the open-tent position, said spreader ring being formed with an aperture therethrough and through which freely extends said elongated hook member in the open-tent position.

4,033,367

TENT APPARATUS FOR FUMIGATION OF BUILDINGS

Taylor C. Johnston, 3745 S. Lake Drive, Miami, Fla. 33155

Filed Dec. 4, 1975, Ser. No. 637,521
Int. Cl.² A45F 1/12; A01G 13/02
U.S. Cl. 135—8 **2 Claims**



1. In a tent for enclosing a building to be fumigated, said tent having a plurality of adjoining flexible panels of substantially gas-tight material which are elongated and progressively narrower from the bottom to the top of the tent, the improvement wherein:

alternate panels in succession around substantially the entire peripheral extent of the tent each have a plurality of manually connectable ties near each side edge of the panel at intervals along the panel length from bottom to top for the connection of any tie to a correspondingly positioned tie on the near side of the next alternate panel to fold behind them the panel which is between said alternate panels for wrapping the tent relatively closely around discontinuities in the building.

4,033,368

GOVERNOR PRESSURE CONTROL APPARATUS FOR VEHICLE AUTOMATIC TRANSMISSION

Noboru Murakami, Nagoya, and Tsunehiko Ogasahara, Kariya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Toyota, Japan

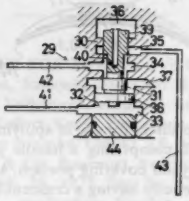
Filed Sept. 4, 1975, Ser. No. 610,410
Claims priority, application Japan, Oct. 3, 1974, 49-114193
Int. Cl.² G05D 13/36
U.S. Cl. 137—54 **3 Claims**

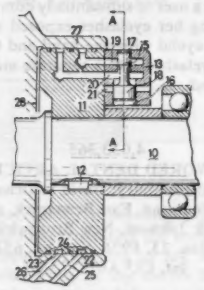
1. A governor pressure control apparatus for vehicle transmission, comprising:

a source of fluid pressure;

governor pressure generating means (28) mounted on a rotational shaft (10) for generating a governor pressure according to the rotation of said rotational shaft (10) and provided with an inlet port (19) fluidically communicated with said source of fluid pressure and an outlet port (20) for supplying a governor pressure; and

governor pressure regulating means (29) including a valve body (30), a valve (31) slidably disposed within said valve body (30) and having a large diameter land (38) and a small diameter land (39), an inlet port (35) fluidically communicated with said source of fluid pressure, an





outlet port (34) for supplying a governor modulated pressure, a port (33) for introducing said governor pressure from said outlet port (20) of said governor pressure generating means (28), and a regulating chamber (36) for acting against said governor pressure in order to regulate said inlet port (35) thereof;

whereby the governor pressure generated by said governor generating means (28) is applied against said large diameter land (38) of said governor pressure regulating means (29) and a governor modulated pressure is provided at outlet port (34) by said small diameter land (39) of said governor pressure regulating means (29) in accordance with the rotational speed of said rotational shaft (10).

4,033,369

SAFETY CONNECTOR FOR PRESSURE TANK

Russell D. Keller, Clackamas, Oreg., assignor to Temco Metal Products Company, Inc., Clackamas, Oreg.

Filed Nov. 3, 1975, Ser. No. 628,377
Int. Cl.² F16K 17/00
U.S. Cl. 137—68 R **10 Claims**

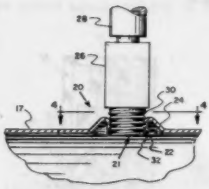
1. In a brake system for a vehicle, the improvement of a tank safety connector apparatus comprising:

a pressure tank for holding gas at greater than atmospheric pressure, having a cylindrical side wall portion and a pair of opposite end portions closing the opposite ends of said side wall portion;

means for connecting said tank to said brake system;

safety connector means provided on the side wall portion of said tank for transmitting said gas through an opening in said side wall portion; and

said connector means including a threaded connector portion surrounding said opening, adapted to receive an insert member, said threaded connector being formed integral with the cylindrical side wall portion of the tank so that said threaded connector deforms when the pressure within the said tank exceeds a predetermined pressure below the bursting pressure of said tank and acts as a safety valve to cause the gas with said tank to slowly leak out through the resulting space between the insert member and said threaded connector.



4,033,370
MIXING VALVE FOR CONTROLLING PRESSURE AND TEMPERATURE OF A LIQUID

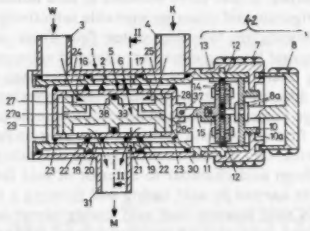
Werner Egli, Egliau, Switzerland, assignor to Armaturenfabrik Wallisellen AG., Wallisellen, Switzerland

Filed Oct. 15, 1975, Ser. No. 622,785

Claims priority, application Switzerland, Oct. 15, 1974, 13832/74

Int. Cl.² F16K 11/02

U.S. Cl. 137—100 **7 Claims**



1. In a mixing valve for mixing two input liquids having different temperatures and pressures, more particularly for mixing cold and hot water having variable openings of passage for controlling both the temperature and quantity of liquid output using a pressure equalizing cartridge, the improvement comprising: said cartridge having a cylindrical housing, a liner member disposed about said cartridge; a plurality of radial discharge openings on said housing, a piston within said cartridge and axially movable in response to pressure variations; a combined control means for controlling liquid temperatures and quantities, said openings forming a part of said control means; said liner having two series of discharge ports and said control means operable to completely block each of the two series of discharge ports in sections of the liner pipe said discharge ports disposed in operative variable connection with the discharge openings; said cartridge disposed for both rotatory and axial movement relative to the liner to vary the operative connection of said discharge ports and discharge openings; said relative axial movement of the pressure equalizing cartridge with a corresponding section of the liner pipe varying the proportions of the input liquids to control the temperature, and said relative rotary movement of the pressure equalizing cartridge with the sections of the liner pipe blocking said discharge ports to control quantity.

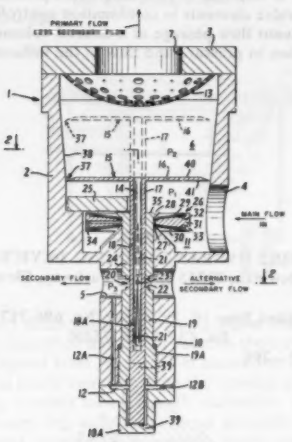
4,033,371
PROPORTIONING VALVE FOR VOLUMETRIC PROPORTIONING OF FLOW

Cyril A. Keedwell, Lovedean, England, assignor to Pall Corporation, Glen Cove, N.Y.

Filed June 24, 1976, Ser. No. 699,743

Int. Cl.² G05D 11/00

U.S. Cl. 137—100 **5 Claims**



1. A proportioning valve for volumetric proportioning of flow in an influent fluid line between two effluent fluid lines, comprising, in combination, a housing; valve chamber; an influent flow passage and two effluent flow passages in the housing in fluid flow connection via the valve chamber; a first valve element interposed across the line of flow between influent and effluent flow passages in a manner to sense influent flow and apportion influent flow between the two effluent flow passages, and mounted in the valve chamber for movement between limiting positions and a multiplicity of intermediate pressure-balanced positions therebetween; the first valve element having a first pressure surface exposed to upstream fluid pressure in the influent flow passage tending to move the valve element in one direction; a second pressure surface exposed to downstream fluid pressure in the valve chamber, tending to move the valve element in the opposite direction; and a third pressure surface exposed to downstream fluid pressure in one effluent flow passage tending to move the element in said opposite direction; the first valve element assuming a position with respect to the limiting positions responsive to influent volumetric flow, and in proportion to such flow and a balancing differential pressure-related force acting on the second and third pressure surfaces; the first valve element defining with side walls of the valve chamber a first variable opening for fluid flow into the chamber from the influent flow passage, the open area of said first opening available for flow being related to the valve position, the first valve element also defining with a wall of said one effluent line passage a second variable opening for fluid flow into the said passage from said chamber, the open area of said second opening available for flow being related to the valve position; the first valve element defining the opening size in proportion to volumetric flow in the influent line into the valve chamber; a second valve element movable independently of and cooperating with the first valve element in defining the size of the second variable opening; the second valve element having a first pressure surface exposed to upstream fluid pressure in the influent flow passage tending to move the valve element in one direction, and a second pressure surface exposed to downstream fluid pressure in the said one effluent line passage tending to move the valve in the opposite direction; bias means urging the second valve element in one direction, and

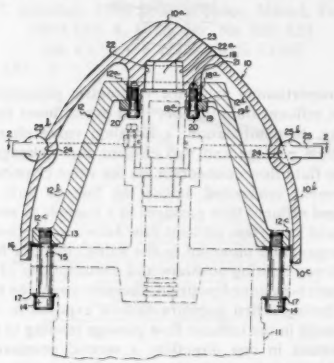
resisting movement of the second valve element in the opposite direction, but permitting movement in that direction at pressures exceeding a predetermined minimum, in a manner such that its resistance to that movement increases as the valve element moves in that direction; the second valve element being movable against the bias means in response to a sufficient differential pressure between the influent passage and the said one effluent flow passage, to define the variable opening size in response to said differential pressure, the first and second valve elements in combination controlling flow in said one effluent flow passage at a desired volume and pressure in relation to pressure and flow in the influent flow passage.

4,033,372

FIRE HYDRANT LOCKING DEVICE

Harold M. Bowman, 29355 Ranney Parkway, Cleveland, Ohio 44145

Filed June 16, 1976, Ser. No. 696,757
Int. Cl.² F16K *35/06*
U.S. Cl. 137—296 **8 Claims**



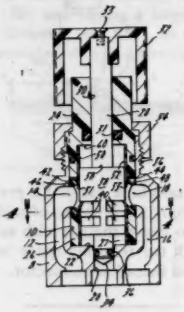
1. A fire hydrant locking device comprising a rigid spider having a top and a plurality of downwardly extending legs integral with said top at the periphery thereof, each of said legs terminating in a foot adapted to be firmly attached to a fire plug of known type, there being a central circular opening through said spider top, a dome encompassing said spider having a downwardly extending annular skirt of a size to fit snugly around said fire plug, said dome being imperforate and having an apex, said dome having a plurality of inwardly extending wrench-receiving recesses located at a common level part way down the skirt of said dome, having at its apex a downwardly extending enlargment terminating at its lower end in a circular projection axially of said dome and adapted to just extend through and to rotate inside said circular opening in said spider top, said circular projection having a flat bottom surface, a retaining ring having a flat top and being of an outside diameter greater that of said circular opening and adapted to abut said spider top and having an inside diameter permitting attachment to the bottom of said circular projection, removable means for such attachment, and said enlargement having an axial central recess opening downwardly, said last named recess terminating at its upper end in a non-circular opening adapted to snugly fit the operating nut of the hydrant structure of said fire plug, whereby said hydrant may be turned in an opening direction only by a special wrench having projections arranged to fit in said wrench-receiving recesses to rotate said dome.

4,033,373

SINGLE HANDLE WATER FAUCET VALVE

Alex Manoogian, Grosse Pointe Farms, Mich., and Eric V. Pullen, Boca Raton, Fla., assignors to Masco Corporation of Indiana, Greensburg, Ind.

Filed June 3, 1976, Ser. No. 692,451
Int. Cl.² F16K *11/02, 19/00*
U.S. Cl. 137—454.6 **13 Claims**



1. A single handle water faucet valve including a housing having a central chamber open at one of its ends, hot and cold water input passages formed therein being connectable to pressurized sources of hot and cold water, respectively, and each communicating with said housing chamber through openings in a wall thereof and a water discharge passage formed therein communicating between said housing chamber and exterior of said housing, the improvement comprising: a valve casing at least partially telscopically received in said housing chamber, a first valve member in said housing chamber and contiguous said chamber movable selectively between positions allowing or blocking water flow from said input passages into said housing chamber, a second valve member in said housing chamber movable selectively between positions allowing or blocking water flow from said housing through said discharge passage, a manually operable handle connected to both said first and second valve members for unitary movement therewith, said handle carried by and extending through said casing from said chamber to exterior of said faucet, first sealing means carried by said casing and forming a watertight seal between said housing and said casing about said water input openings, and second sealing means carried by said casing and forming a watertight seal between said casing and said first valve member, said casing first valve member, second valve member, handle, first sealing means and second sealing all comprising a valve cartridge subassembly capable of insertion and removal from said housing as a unit.

4,033,374

LATCH ASSEMBLY FOR SLAM-SHUT VALVES

Joseph Solomon Danon, El Toro, Calif., assignor to The Singer Company, New York, N.Y.

Filed June 2, 1976, Ser. No. 692,162
Int. Cl.² F16K *17/00*
U.S. Cl. 137—461 **6 Claims**

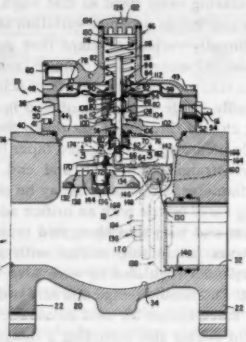
1. A slam-shut valve comprising:
a. a housing having an inlet and an outlet in communication with a chamber therebetween,
b. a diaphragm housing connected to the valve housing above the chamber,
c. a diaphragm mounted in the diaphragm housing,
d. a pressure chamber formed on one side of the diaphragm in communication with line pressure to signal an overpressure condition which will cause the diaphragm to expand,
e. a release shaft journaled in the diaphragm housing,
f. a release mechanism connected to the diaphragm normally to hold the release shaft in locked raised position

and upon expansion of the diaphragm to release the shaft and to permit the shaft to drop vertically downwardly,

g. the release shaft having one end extending into the chamber, with a groove formed adjacent said end,

h. a reset shaft journaled in the chamber and adapted to be rotated about its axis therein,

i. a lever pivotally mounted upon the reset shaft and adapted to be raised upon rotation of the reset shaft,



j. a valve element connected to the lever adapted to close the outlet of the valve, and

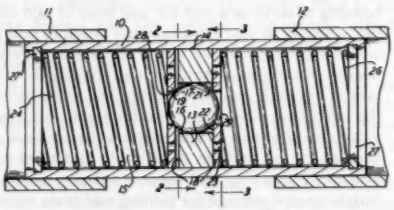
k. a spring latch affixed to the lever to be unidirectionally yieldable upon raising of the lever, and normally to be engaged within the groove of the release shaft to hold the lever and valve element within the chamber in raised position.

4,033,375

TWO-WAY FLUID PRESSURE RELIEF VALVE

Arthur Edward Hirsch, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.

Filed May 7, 1976, Ser. No. 684,400
Int. Cl.² F16K *15/00*
U.S. Cl. 137—493.9 **3 Claims**



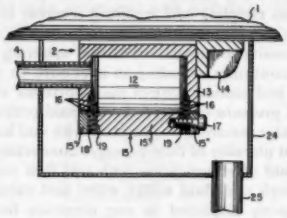
1. A two-way fluid pressure relief valve comprising a valve body having a fluid-flow chamber extending therein, two valve seats disposed spaced apart in said chamber and faced oppositely from each other, a movable valve closure disposed in said chamber and having a plurality of pieces with two of said pieces being movable and fluid-tightly seatable on a respective one of said two valve seats, a spring in said body and operative on each of said two closure pieces and yieldably urging said pieces to their respective seated positions on said valve seats, said valve closure including a spherically-shaped piece disposed between said valve closure two pieces and exposed to fluid pressure in said chamber and movable in response to fluid pressure in said chamber and engagable with said two pieces for respective unseating of said two pieces against the urging of said spring, the diameter of said spherically-shaped piece being greater than the spacing between said two valve seats, such that only one at a time of said valve closure two pieces can seat on its said valve seat.

4,033,376

ROTARY DRUM PLANT WITH WATER INTRODUCTION SYSTEM

Ib Verner Trelby, Copenhagen, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Filed Apr. 30, 1976, Ser. No. 681,835
Claims priority, application United Kingdom, May 7, 1975, 19187/75
Int. Cl.² F16L *27/00*
U.S. Cl. 137—580 **20 Claims**



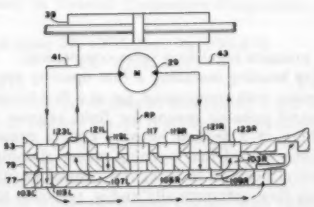
1. A rotary drum plant which comprises a rotatable drum and a shaft connected thereto for rotation therewith, a generally U-configured inner ring member secured to said rotating shaft so as to rotate therewith, with the opening of the U-configured ring member facing radially outwardly, at least one outer stationary ring member having a generally rectangular cross-sectional configuration position about said rotatable U-shaped ring member to form a generally annular chamber with said inner U-configured ring member around said rotatable shaft, at least one conduit connected to the outer stationary ring member and adapted to direct a liquid medium to the chamber, at least one conduit communicating with a rotatable will of said U-configured ring member and adapted to direct a liquid medium from said chamber to said rotatable drum, and sealing means positioned between the stationary and rotatable ring members, each sealing means being comprised of at least one annular sealing element mounted on said stationary ring member and positioned to contact inner surface portions of adjacent corresponding radial wall portions of said U-configured rotatable ring to form a liquid seal between said ring members.

4,033,377

CONTROLLER FOR FLUID PRESSURE OPERATED DEVICES

Oliver Wendell Johnson, Chaska, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 507,015, Sept. 18, 1974, abandoned. This application Apr. 23, 1976, Ser. No. 679,607
Int. Cl.² B62D *5/08*
U.S. Cl. 137—596 **18 Claims**



12. A controller for fluid pressure operated devices, said controller comprising:

a. a housing;

b. valve means disposed in said housing including a primary, rotatable valve member and a cooperating, relatively rotatable follow-up valve member, said valve members defining a neutral position relative to each other and having generally coincidental axes of rotation;

c. means coupling said follow-up valve member to said primary valve member for limited movement relative to said neutral position and for common rotary movement therewith;

d. a fluid meter including a metering member movable to measure the volume of fluid which passes therethrough;

e. means coupling said metering member to said follow-up valve member for imparting follow-up movement thereto responsive to movement of said metering member;

f. said controller including an inlet port, an outlet port, and first and second control fluid ports for connection to a fluid pressure operated device, said primary and follow-up valve members cooperating with said housing to define a first pluraiity of fluid passages connecting said inlet port in fluid communication with said first control fluid port through said fluid meter when said valve members are relatively displaced in one direction from the neutral position, and a second plurality of fluid passages connecting said inlet port in fluid communication with said second control fluid port through said fluid meter when said valve members are relatively displaced in the other direction from the neutral position;

g. said first and second pluralities of fluid passages being oppositely and approximately equally disposed about a reference plane perpendicular to the axes of rotation of said valve members to provide a controller having uniform response in either direction of relative displacement of said valve members.

4,033,378

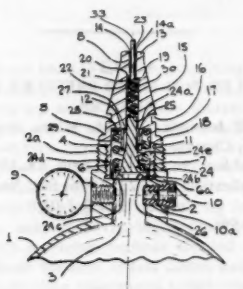
COMPRESSED GAS VALVE WITH CONSTANT FLOW

Richard S. Pauliukonis, 6660 Greenbriar Drive, Cleveland, Ohio 44130

Filed Dec. 10, 1973, Ser. No. 423,546

Int. Cl.² F16K *11/10*

U.S. Cl. 137—614.19 **2 Claims**



1. A pressure regulating valve comprising:

a valve housing including a first opening means for direct contact with compressed gas at a first housing end and a second opening means for fluid exhaust to the atmosphere at a second housing end, a pressure reducing means in said first opening means slidable from a first neutral position to a second control position regulating fluid flow automatically and in response to the cylinder pressures by means of biasing force means incorporated therein, a main valve means in said second opening means slidable from a first position blocking fluid communication between said first and second opening means to a second position allowing fluid exhaust therefrom, means for shifting said main valve means from one of said positions to the other of said positions, means for maintaining said main valve means in one of said positions including means for substantially constant exhaust of gas flow regardless of pressure variation therein, and control means of siad pressure reducing means when said main valve means are open urging an automatic regulation of fluid flow therethrough, said pressure reducing means including a metering valve sized so that when said first opening means experiences pressure variation said metering valve proportionally varies prevalent flow passages leading to said main valve means for exhaust, said proportionallity between said pressure and said flow achieved through use of a needle inside an orifice of said metering valve controlling closely throttle of gas flown therebetween,

said needle including an elongated taper between a reduced diameter straight stem with and end and an opposite, larger diameter flange which may be skirted,

a metering valve nozzle with an orifice adaptable to receive said stem end with said elongated taper which in operation moves inside said orifice with pressure variation inside cylinder regulated by said valve, including a spring between said needle flange and said orifice providing said biasing force means for said automatic fluid flow regulation, said nozzle also including a flange,

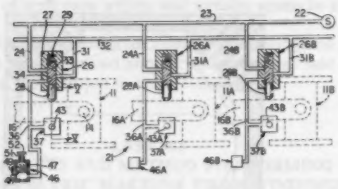
said main valve means including an elongated pin with a head on one end thereof to keep valve closed,

said first valve housing end is provided with a counterbore for housing said metering valve with said nozzle, said second housing end is provided with a central passage therein initiating with a small opening comprising said second opening means of said valve housing serving as fluid exhaust which initiates at said nozzle inside said counterbore, said small opening continuing inwardly from said second housing end toward said first housing end and including a third opening therebetween of a diameter slightly larger than said second opening and slightly smaller than said counterbore, a first shoulder between said first and third openings receiving said flange of said metering valve nozzle while said nozzle facing said first opening, a second shoulder between said second and third openings having said central passage of said second opening to serve as a seat for said head of said elongated pin, a spring in said third opening abutting said head of said elongated pin at one spring end and said stem of said needle entering said third opening slidably for participation in pressure reduction during said valve throttling at the other end, including means for maintaining said main valve means in one of said positions by pressure of compressed gas on said pin head inside said third opeining, said pin protruding said second opening means of said nozzle central passage for shifting said main valve means from said first position blocking fluid communication between said first and second openings to said second position allowing fluid exhaust when said main valve pin is externally depressed, including an automatic valve return to said first position by said gas pressure together with said spring in said third opening as soon as said external pin actuation by depression is discontinued, means for securing said valve housing to a boss of a gas cylinder by said first housing end so as to have said skirted flange of said needle resting on a shoulder provided inside said boss during the initial valve assembly thereto with ability to subsequently move axially therefrom toward said counterbore for flow control during the withdrawal of gas through said nozzle and said metering needle valve regardless of pressure variation in said gas cylinder enabling a regulated atmospheric exhaust at constant gas flow therefrom when said pin is depressed.

4,033,379
PNEUMATIC VALVE INTERLOCK SYSTEM

Clyde E. Tooley, Vicksburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Dec. 18, 1975, Ser. No. 642,074
Int. Cl.² F16K 35/14
U.S. Cl. 137—637.1 11 Claims



10. In combination with a plurality of remotely located valve assemblies each having a movable external valve operator which is normally maintained in a preselected position, and a fluid-actuated interlock system cooperating with said operators for permitting only a single valve operator to be moved away from its preselected position at any one time, said interlock system being operated solely in response to movement of said operators and independently of flow through said valve assemblies, said interlock system comprising:

a fluid-actuated locking device disposed adjacent and associated with each valve operator to prevent movement of the respective valve operator away from its preselected position when said locking device is actuated, said locking device including a locking member movable between a released and an actuated position, said locking member when in said actuated position preventing any significant movement of said valve operator away from said preselected position;

means associated with each said locking device for normally maintaining the respective locking member in said released position;

conduit means connected to the locking devices for supplying pressure fluid thereto to permit energization thereof;

flow control valve means associated with said conduit means for controlling the flow of pressure fluid to said locking devices, said flow control valve means normally preventing pressure fluid from being supplied to said locking devices; and

sensing means associated with each said valve operator and interconnected to said flow control valve means for causing opening of said valve means when said sensing means senses the movement of one of said valve operators away from its preselected position, the opening of said flow control valve means by said sensing means causing pressure fluid to be supplied to said locking devices as associated with at least the remaining valve operators to lock same in same preselected positions.

4,033,380
THREAD PROTECTOR

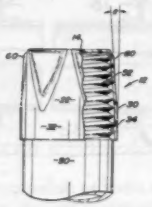
Richard C. Weber, 2589 Sears Road, Stow, Ohio 44224

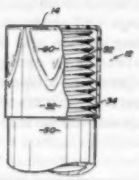
Continuation of Ser. No. 539,366, Jan. 8, 1975, abandoned, which is a continuation of Ser. No. 348,061, April 5, 1973, abandoned. This application Aug. 27, 1975, Ser. No. 608,036
Int. Cl.² B65D 59/08
U.S. Cl. 138—96 T 12 Claims

1. A thread member and thread protecting device received over at least the threaded portion of said member in a close spaced thread protecting relationship therewith comprising in combination:

said member having standard, tapered pipe threads disposed axially along at least a portion thereof from one end which has a minimum outside thread diameter toward an area spaced inwardly from said one end having a maximum outside diameter; and,

said thread protecting device having a generally cup-shaped body portion including a thin resilient continuous side wall with inner and outer surfaces, a closed bottom end and an open upper end, said cup-shaped body portion increasing in cross-sectional dimension over at least a portion of the axial length thereof from said closed bottom end toward said open upper end; at least said inner surface of said body portion side wall having a generally frusto-polygonal cross-sectioned portion adjacent said closed bottom end and a generally cylindrical portion adjacent said open upper end with said frusto-polygonal and cylindrical portions merging together at a merger





zone spaced axially along said body portion inner surface from said closed bottom end toward said open upper end; said frusto-polygonal portion of said inner surface being comprised of alternating sides and transition zones with each of said sides including a pair of corner edges extending generally axially of said side wall inner surface, said frusto-polygonal portion having a minimum inside diameter slightly less than said minimum outside thread diameter and tapering outward from said closed bottom end at an angle greater than the taper angle of said threads with said cylindrical portion having an inside diameter greater than said maximum outside thread diameter, said frusto-polygonal portion sides closely engaging only a portion of at least some of said pipe threads adjacent said threaded member one end.

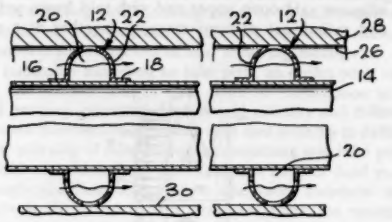
4,033,381
HOT AIR DUCT

Ray Newman, Sun Valley, and Steve Affa, Torrance, both of Calif., assignors to General Connectors Corporation, Burbank, Calif.

Filed June 27, 1975, Ser. No. 590,878
Int. Cl.² F16L 9/18
U.S. Cl. 138—113 1 Claim

1. A hot air duct for use in aircraft comprising a thin walled tube, a plurality of linearly spaced reinforcing rings secured to the external surface of the tube to prevent the tube from collapsing if the internal pressure of the tube drops substantially, each of said reinforcing rings formed from sheet material and comprising a channel-shaped portion with oppositely extending flange mounting portions attached to the channel shaped portion, said reinforcing rings mounted on the external surface of the tube so the channel shaped portions project radially outwardly providing a heat radiating and a spacing

surface around the tube with the channel shaped portion opening inwardly and facing and completely closed off by the external surface of the tube to reinforce the tube, defining thereby a ring shaped chamber around the tube, said oppositely extending flange mounting portions rigidly fastened to the external surface of the tube, an aligned opening formed in each side of each of the channel shaped portions providing thereby communication between the interior and exterior of the channel-shaped portion, said reinforcing rings mounted on the thin walled tube so that the aligned openings in each channel shaped portion of the reinforcing ring are all in linear



alignment with each other to define continuous air channels running parallel to the axis of the tube along the length of the tube whereby the external surface of the tube can be cooled readily if a flow of cold air is directed through the said aligned openings in the ring shaped chambers of the reinforcing rings, when said rings engage and serve as a spacer between said duct and a surrounding surface said channel shaped portions extending radially outwardly far enough so if said hot air duct is mounted closely adjacent a surface in the aircraft said channel shaped portions serve as spacers to keep the surface of the tube from rubbing against the surface of the aircraft.

4,033,382

SELF-SUSTAINING STICK OF SHIRRED FOOD CASING

Harry P. Eichin, Western Springs, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed Nov. 18, 1974, Ser. No. 524,719
Int. Cl.² F16L *11/08, 11/10*
U.S. Cl. 138—118.1 **4 Claims**

1. A self-sustaining length of shirred and compressed tubular food casing comprising in combination:

a. a stick of shirred and compessed tubular food casing having a bore extending therethrough; and

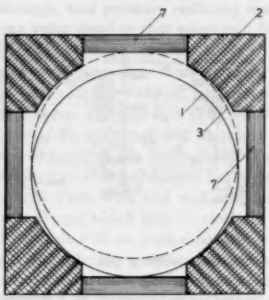
b. a thin, flexible sheathing material having an aperture with a reinforced edge at each end thereof that is closely drawn and tensioned about the periphery of the full length of said stick of shirred casing and with each of the ends thereof being closely drawn down about at least a portion of the pleats at each end of said stick, and terminating in an aperture with an integral fused bead of sheathing material forming the edges thereof, said reinforced apertures being smaller than the outer diameter of said shirred stick and substantially aligned with the bore through said shirred casing stick, said sheathing material totally retaining said stick of shirred food casing therein and forming a self-sustaining length thereof.

4,033,383

THERMAL INSULATION ASSEMBLY

Peter Josef Heptner, Voerde, Germany, assignor to Diamond Power Specialty Corporation, Lancaster, Ohio

Continuation-in-part of Ser. No. 535,786, Dec. 23, 1974, abandoned. This application Mar. 1, 1976, Ser. No. 662,668
Int. Cl.² F16L *9/14, 3/00*; E04B *1/98*
U.S. Cl. 138—149 **1 Claim**



1. A thermal insulation assembly for enclosing a pressurized duct within an enclosure having four corners comprising:

a pressurized duct;

an enclosure formed around said duct to have four corners;

corrugated energy absorbing insulating means formed at each corner of said enclosure to have a series of layers for insulating the corners of said enclosure and for allowing the enclosure to absorb the forces arising from a rupture of the pressurized duct, each of said series of layers being formed by a plurality of aligned corrugated metal sheets spaced from each other and extending diagonally across each of the corners of the enclosure to minimize thermal conductivity therebetween; and

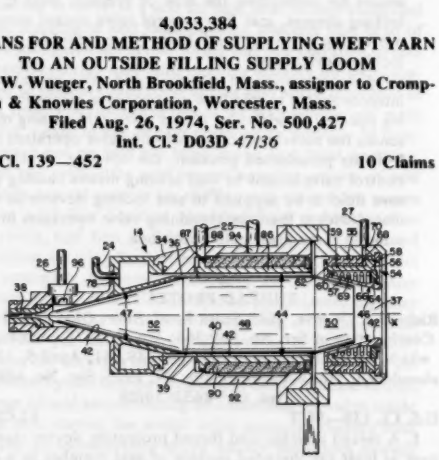
a series of spaced planar sheets extending between adjacent corrugated insulating means to thermally insulate the pressurized duct along the remainder of the enclosure not insulated by said corrugated insulating means to completely surround said duct by thermal insulation.

4,033,384

MEANS FOR AND METHOD OF SUPPLYING WEFT YARN TO AN OUTSIDE FILLING SUPPLY LOOM

Karl W. Wueger, North Brookfield, Mass., assignor to Crompton & Knowles Corporation, Worcester, Mass.

Filed Aug. 26, 1974, Ser. No. 500,427
Int. Cl.² D03D *47/36*
U.S. Cl. 139—452 **10 Claims**



1. Apparatus for preparing a length of weft yarn in a magazine for weft insertion in a shuttleless loom comprising:

a. a housing having a chamber which is circular in cross section, an inlet opening connected to one end of said

chamber, and an outlet opening connected to the opposite end of said chamber;

b. means for feeding weft yarn to said inlet opening from a supply package;

c. a core movable along its longitudinal axis within said chamber and which cooperates with the inner wall of said chamber to form an annular space therebetween;

d. first actuator means for creating an air flow from said inlet opening to said annular space and for creating a helical air flow within said annular space for depositing a length of weft yarn within said annular space in a helix; and

e. second actuator means for axially withdrawing said length of weft yarn from said annular space through said outlet opening for insertion in a shuttleless loom.

4,033,385

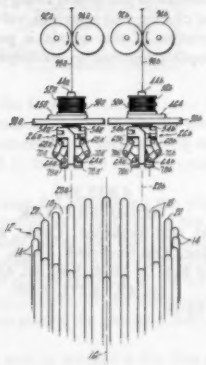
APPARATUS AND METHOD FOR FORMING DYNAMOELECTRIC MACHINE FIELD WINDINGS BY PUSHING

Donald R. Taube, Fort Wayne, Ind., assignor to Essex Group, Inc., Fort Wayne, Ind.

Filed Sept. 2, 1976, Ser. No. 720,039

Int. Cl.² B21F *3/00*; H02K *15/04*

U.S. Cl. 140—92.1 **36 Claims**



1. The method of placing magnet wire in slots respectively defined by spaced blades of coil transfer apparatus to form a dynamoelectric machine field winding, said method comprising the steps of: (a) advancing said wire by pushing the same on its axis without applying tension thereto; (b) guiding said advancing wire through a rotating nozzle having a wire dispensing exit at a fixed radial distance from the rotational axis of said nozzle whereby said wire is pushed in a direction away from said dispensing exit; and (c) cyclically varying the relationship of the rate of said pushing to the angular velocity of said nozzle such that said wire is directed from said dispensing exit along a predetermined path having an alternately increasing and decreasing radius in relation to said rotational axis, said path having sections respectively aligned with the open ends of two of said slots whereby said wire is pushed into said slots through said open ends.

4,033,386

WIRING HEAD WITH RESILIENTLY LOCKED AND RESETTABLE GUIDE TUBE MOUNTING ASSEMBLY

Virgil W. Wood, Rockwall, Tex., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,044

Int. Cl.² B21F *27/00*

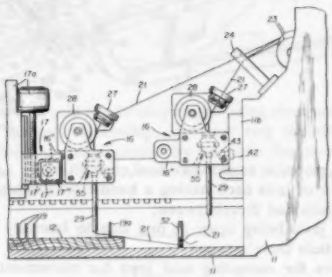
U.S. Cl. 140—92.1 **18 Claims**

1. A wiring head for use in guiding wire along a predetermined path, said wiring head including:

housing means having an opening extending centrally therethrough;

multi-directional rotatable means mounted within said opening, and confined for movement about a fixed axis center of rotation, said rotatable means having a central bore extending therethrough;

expandable spring means communicating with said opening for normally resiliently locking said rotatable means into a predetermined position whereat the bore therethrough communicates with the opening through said housing, said spring means upon being expanded allowing the orientation of said rotatable means into an unlocked



position encompassing all possible angles of orientation falling within a predetermined maximum degree of angular displacement in any given direction relative to said locked position, and

a wire guide tube secured to said rotatable means, with the bore through the former communicating with the bore through the latter, said guide tube thereby being capable of being tilted from a normal resiliently locked position to any other angle of inclination corresponding to that acquired by said rotatable means, with any force-induced tilting of said guide tube causing said spring means to expand.

4,033,387

METHOD OF MAKING A REINFORCING STRIP

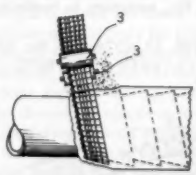
Marc Nijs, Harelbeke; Frits Vanassche, Zwevegem, both of Belgium, and Johannes Arnoldus De Kok, Hoogezand, Netherlands, assignors to N.V. Bekaert S.A., Zwevegem, Belgium

Filed Sept. 17, 1975, Ser. No. 614,227

Claims priority, application United Kingdom, Sept. 27, 1974, 42142/74

Int. Cl.² B21F *27/22*

U.S. Cl. 140—105 **16 Claims**

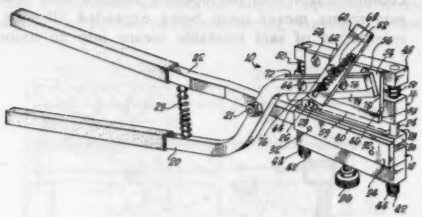


1. A method of making a reinforcing strip comprising providing a strip of welded wire mesh comprising a plurality of longitudinal wires and a plurality of spaced-apart transverse wires welded to said longitudinal wires, the length of longitudinal wire between adjacent transverse wires being substantially uniform across the width of said strip, and deforming at least some of said longitudinal wires to produce a deformation in said at least some of said longitudinal wires which deformation increases progressively across said strip.

4,033,388
BENDING AND CUTTING TOOL

Richard A. Ruegger, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 3, 1976, Ser. No. 682,693
Int. Cl.[2] B21F 1/00
U.S. Cl. 140—106 4 Claims

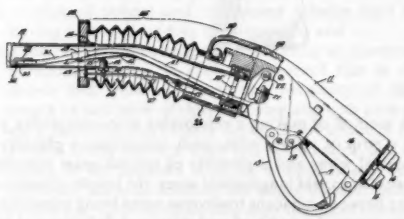


1. A portable scissor-like tool comprising:
a pair of jaws each having a handle for working an article positioned therebetween;
said jaws being open at one side to laterally receive the article therebetween;
means for mounting said jaws for movement in parallel relationship to each other;
each of said jaws having opposing clamping members for first gripping the article when the handles are initially squeezed together;
each of said jaws having opposing bending members for bending an end of the clamped article protruding beyond said clamping members upon further squeezing of the handle;
a cutting member mounted on one of said handles adjacent a corresponding jaw;
an actuating member resiliently connected to one of said jaws for applying pressure to the respective clamping member of said one jaw adjacent the cutting member;
a manually operable pivotal link connecting said actuating member to said handle;
said pivotal link being releasable from said actuating member to enable the handles to be further squeezed together and the cutting member moved relative to the actuating member for trimming off any portion of the article extending beyond the bending members.

4,033,389
INTERLOCK AND LATCHING SYSTEMS FOR A DISPENSING NOZZLE

William B. Hansel, Media, and Myrl A. Lindeman, Newtown Square, both of Pa., assignors to Suntech, Inc., St. Davids, Pa.

Filed Feb. 17, 1976, Ser. No. 656,997
Int. Cl.[2] B65B 31/00; B67C 3/34
U.S. Cl. 141—207 7 Claims

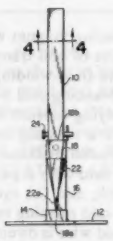


1. A nozzle for dispensing fuel into a fillpipe of a motor vehicle fuel tank and having a system for shutting off the fuel being dispensed when fuel backs up into a fillpipe and comprising:
a. a discharge spout for insertion into a fillpipe of a motor vehicle fuel tank;
b. a shut-off valve for shutting off fuel being dispensed by the nozzle;
c. actuating means for closing said shut-off valve in response to fuel backed up into a fillpipe and including a vent line extending into said discharge spout and having an open end at the discharge end of the discharge spout, said vent line being supplied with a vacuum such that when gasoline covers the open end of the vent line, the pressure in the vent line drops and the pressure drop may be sensed to actuate said shut-off valve; and
d. an interlock system which prevents the dispensing of liquid through the nozzle until the discharge spout of the nozzle is properly inserted in a fillpipe, and comprising an interlock valve means coupled to the vent line, said valve means having an open position wherein the vent line is open to the inside of the discharge spout so that in the event dispensing is attempted, fuel enters the vent line causing the pressure in the vent line to drop to cause said actuating means to close said shut-off valve and having a closed position wherein the vent lint is not open to the inside of the discharge spout which permits normal operation of the nozzle, and
e. means, responsive to the nozzle being properly inserted in a fillpipe, for closing said interlock valve means, whereby normal operation of the nozzle is permitted when the nozzle is properly inserted in a fillpipe.

4,033,390
WOOD SPLITTER

Carl Piontkowski, Old Saybrook, Conn., assignor to C & D. Distributors, Inc., Old Saybrook, Conn.

Filed Feb. 2, 1976, Ser. No. 654,636
Int. Cl.[2] B27L 7/00
U.S. Cl. 144—193 D 9 Claims

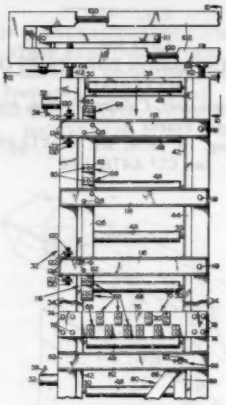


1. A device for splitting logs or the like, and comprising a horizontally extending base for supporting a log to be split in a generally upright orientation, a fixed post carried by the base and extending upwardly therefrom, wedge means slidably mounted on said post for movement toward and away from said base, said wedge means including an elongated sleeve slidably received on said post and a tapered downwardly pointed wedge member spaced from the sleeve, said wedge member having an upwardly facing abutment surface adapted to be struck to drive the lower chisel edge of said wedge member into the log, said wedge means further including bracket means connecting said wedge member to said sleeve and a second wedge member also of downwardly tapered configuration and having a pointed lower chisel edge which defines an included angle slightly greater than that defined by said first mentioned wedge member.

4,033,391
APPARATUS AND METHOD FOR FORMING PLANKS FOR USE IN CHORD COMPONENTS OF INTEGRAL TRUSS-SUPPORTED DECKS

Arthur L. Troutner, Boise, Idaho, assignor to Trus Joist Corporation, Boise, Idaho

Filed Mar. 26, 1976, Ser. No. 670,836
Int. Cl.² B27C *3/04*; B23P *3/00*
U.S. Cl. 144—321 **9 Claims**



1. An apparatus for forming planks for use in chord components of integral truss-supported decks formed from a plurality of planks interconnected at their leading and trailing edges by splice plates and at their sides by side connectors, comprising:

a. an elongate frame for supporting the planks,

b. an end stop located at a first end of the frame for accurately positioning the planks longitudinally in the frame,

c. a side stop located on one side of the frame for accurately positioning the planks laterally in the frame,

d. registering means on the frame for registering one of the longitudinal margins of the planks positively with the side stop,

e. a leading edge drill jig located at the first end of the frame above the leading edge of the planks adjacent the end stop, and a plurality of drill guide means, located in a spaced array in the leading edge drill jig for drilling splice plate attachment holes in a predetermined pattern in the leading edge of the planks,

d. a trailing edge drill jig located at the opposite end of the frame above the trailing edge of the planks, and a plurality of drill guide means, located in the trailing edge drill jig in a spaced array for drilling splice plate attachment holes in a predetermined pattern in the trailing edge of the planks, and

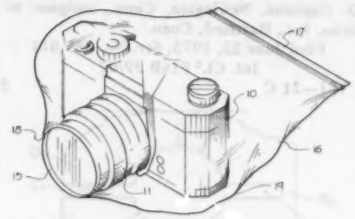
g. an edge drill jig located above the frame, and a plurality of drill guide means positioned in the edge drill jig for drilling side connector holes in a longitudinally spaced relation along the sides of the planks.

4,033,392
WEATHERPROOFING DEVICE FOR CAMERAS

Henry R. Less, 248 Bancroft Bay, Winnipeg, Canada

Filed Apr. 23, 1976, Ser. No. 679,673
Int. Cl.² G03B *17/56*
U.S. Cl. 150—52 J **6 Claims**

1. A flexible enclosure for cameras which include a lens assembly and a filter screw threadably engageable with the front end of said lens assembly, said enclosure comprising in combination a flexible transparent enclosure, access means to said enclosure, detachable closure means for said access means, a circular aperture formed through the wall of said enclosure remote from said access means, reinforcing means around the edge of the wall defining said circular aperture and means to detachably secure said enclosure to said camera with said camera inside said enclosure, said last mentioned means including a front ring and a rear ring screw threadably engage-

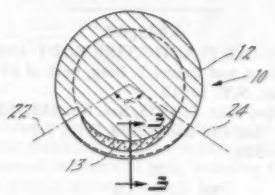


able together with said reinforcing means being clamped there between in sealing relationship, said rear ring including an inwardly extending flange clampable between the associated filter and the end of the camera lens when said camera is within said enclosure.

4,033,393
SELF-LOCKING FASTENER

Ram D. Bedi, Southfield, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. Nos. 121,664, March 8, 1971, Pat. No. 3,818,525, and Ser. No. 191,196, Oct. 21, 1971, abandoned. This application May 23, 1973, Ser. No. 362,996
Int. Cl.² F16B *39/01*, *39/28*
U.S. Cl. 151—14.5 **19 Claims**



1. A reusable self-locking metallic fastener comprising a body and a thread convolution formed on said body about a central axis, said thread convolution being adapted for engagement with a mating thread convolution, said thread convolution on said body including axially spaced thread crests and interposed troughs between the crests, means disposed on said thread convolution on said body for providing an interfering locking engagement with the mating thread convolution to retard relative rotational movement between said thread convolution on said body and the mating thread convolution to effectively lock the thread convolutions together, said means for providing an interfering locking engagement comprising a metallic patch of lower modulus of elasticity than said thread convolutions bonded to said body and extending axially over surfaces defining a plurality of said crests and substantially filling at least one of said troughs, said patch being thicker in said thread troughs than on the adjacent thread crests, said patch having an effective circumferential extension of not more than 180°, said patch extending radially outwardly from said thread convolution on said body to engage said mating thread convolution when said thread convolutions are in threaded engagement at a point axially coincident with said patch, said metallic patch comprising at least one layer of metallic material bonded to said body, said metallic material being substantially resiliently compressible in a radial direc-

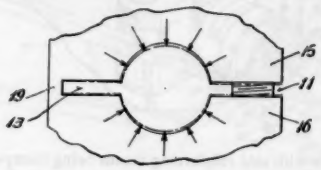
tion to provide said interfering engagement of said thread convolutions at a point circumferentially opposite said patch.

4,033,394

CLAMPING SPLIT LOCK NUT

Terry D. Capuano, Newington, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed June 23, 1975, Ser. No. 589,011
Int. Cl.² F16B *39/02*
U.S. Cl. 151—21 C **5 Claims**



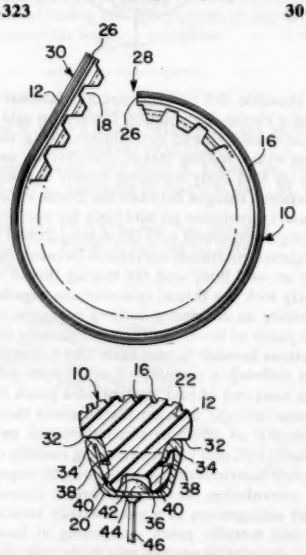
1. A clamping lock nut comprising a nut having an internal bore and an outer periphery, a through radial slot formed to extend from the periphery to the bore, a partial slot formed to extend essentially diametrically opposite the through slot with there being a remaining portion of the nut and means for exerting a closing force on the through slot; in which the cross-sectional area of the remaining portion of the nut is made to provide a tensile strength that is related to the closing force; in which the means for exerting a closing force includes a screw having an end portion threaded into a portion of the nut on one side of the through slot and a head abutting a ledge formed on another portion on the other side of the through slot; in which the maximum force is the actual load to yield force of the screw and in which the cross-sectional area of the remaining portion is substantially equal to three-fourths of the load to yield strength of the screw divided by the yield strength of the nut material.

4,033,395

CONTINUOUS PLASTIC TIRE BODY AND TIRE

Winfred M. Berg, and Daniel T. Berg, both of 89 Grant Ave., E. Rockaway, N.Y. 11518

Filed Mar. 6, 1975, Ser. No. 555,783
Int. Cl.² B60C *7/00, 7/12, 7/24*
U.S. Cl. 152—323 **30 Claims**



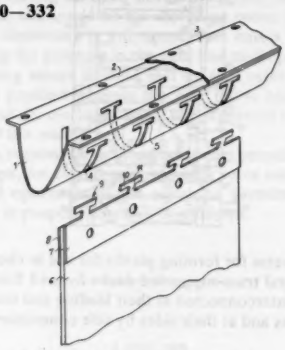
1. A tire, sized to be stretch-snapped over a rim, comprising a selected cut portion of tire body material in finished form, having a first end and a second end, said selected cut portion having been cut from a strip of flexible heat spliceable plastic tire body material of indeterminate length comprising tread means and rim fit means, said selected cut of material having been curved into an annular shape with said first end and said second end held in abutting relationship and spliced with means comprising a thin hot blade held temporarily between said abutting ends.

4,033,396

OSCILLATING SUSPENSION FOR STRIPS OF PLASTIC MATERIAL

André Alphonse Thomasset, Caluire, France, assignor to Planet-Wattohm, Paris, France

Filed Aug. 16, 1976, Ser. No. 714,491
Int. Cl.² A47H *1/00*
U.S. Cl. 160—332 **8 Claims**



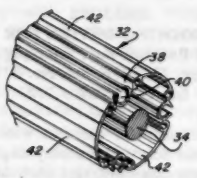
1. Device for suspending strips of plastic material adapted to constitute curtains for doorways which comprises a hollow beam having a generally U-shaped section adapted to be attached to the upper part of the doorway, oscillation slots formed in the lower part of the hollow beam transversely to its longitudinal axis, and suspension means fixed to the upper ends of said strips, said suspension means comprising hooks, each of which has a portion which passes freely through one of the slots of the beam and a retaining head having a width greater than that of said slot and bearing on the inner surface of the hollow beam so as to at least partially support a strip associated therewith.

4,033,397

ROLL BAR DEVICE FOR RETRACTABLE AWNINGS

Donald S. McKee, Louisville, Colo., assignor to The Scott & Fetzer Company, Lakewood, Ohio

Filed Nov. 26, 1975, Ser. No. 635,709
Int. Cl.² A47H *13/00;* **E04F** *10/00*
U.S. Cl. 160—393 **6 Claims**



1. A roll bar for receiving and retaining one edge of an awning sheet so that the awning sheet can be wrapped there-

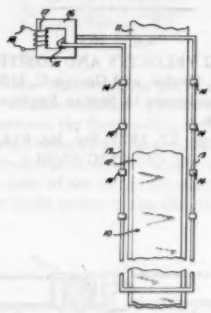
around, including an elongated tubular element having a transverse cross-section defined by at least two spaced circular arcuate segments with a common center, inward indentations separating the arcuate segments, and lip projecting upwardly from spaced locations in the indentations having the outer edges thereof spaced to define a gap therebetween, said lips and indentations cooperating in defining an open groove in which said one edge of an awning sheet can be retained.

4,033,398

METHODS OF MANUFACTURING LAMINATED METAL STRIP BEARING MATERIALS

Eric Roberts Laithwaite, Ditton Hill, England, assignor to Vandervell Products Limited, England

Filed Feb. 27, 1976, Ser. No. 662,243
Int. Cl.² B22D *11/16, 27/02*
U.S. Cl. 164—49 **13 Claims**



1. A method of manufacturing a laminated metal strip comprising casting on a metal backing strip a layer of molten further metal and while the further metal is still molten causing alternating currents to flow in both the metal backing and the molten further metal such that the phase of the alternating currents changes progressively from at least one edge of the metal backing strip so as to produce a travelling magnetic field that restrains flow of molten metal adjacent the said edge of the strip by interaction between the induced currents and the said moving magnetic field.

4,033,399

METHOD FOR CLADDING COPPER AND COPPER ALLOYS TO STEEL SUBSTRATES

Chester E. Bieniosek, McKeesport; Robert H. Kachik, Washington Township, Westmoreland County, and Arthur J. Pignocco, Franklin Township, Westmoreland County, all of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed July 16, 1976, Ser. No. 705,848
Int. Cl.² B22D *19/08;* **B23K** *23/00*
U.S. Cl. 164—54 **3 Claims**

1. A method of cladding a steel substrate with copper and copper alloys comprising:

a. placing a refractory perimeter system onto said steel substrate,

b. depositing onto said substrate within said perimeter system an aluminothermic reduction mixture consisting essentially of 50–65 wt.% cupric oxide, 1.8–2.4 wt.% aluminum; 10–13 wt.% of a calcium-silicon alloy; and 20–38 wt.% of a metal selected from the group consisting of copper, metal desired to be alloyed with copper and mixtures thereof; said calcium-silicon alloy consisting essentially of 30–33 wt.% calcium, 60–63 wt.% silicon and the balance being normal impurities,

c. igniting the mixture to form a molten metal phase and molten slag phase,

d. allowing the molten phases to solidify and cool,

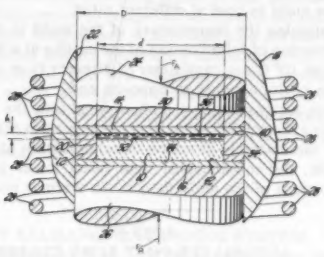
e. removing the refractory perimeter system and slag phase to reveal a tightly adherent metallic cladding on the steel substrate.

4,033,400

METHOD OF FORMING A COMPOSITE BY INFILTRATING A POROUS PREFORM

William E. Gurwell, West Bloomfield, Mich., and Amos J. Shaler, State College, Pa., assignors to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 376,503, July 5, 1973, abandoned. This application Apr. 3, 1974, Ser. No. 457,540
Int. Cl.² B22D *19/02*
U.S. Cl. 164—98 **4 Claims**



1. A method of making a composite material comprising a porous ceramic skeletal body and a metallic infiltrant material filling the pores of the skeletal body including the steps of:

selecting a porous skeletal ceramic host;

selecting a material to be infiltrated within the pores of the porous host;

placing the porous skeletal host within a press having a plunger, the host body being surrounded about its periphery by a peripheral sealing means substantially impervious to liquid metal, a chamber being formed at one side of the host generally inwardly of the peripheral sealing means;

placing a predetermined quantity of a metallic material, to be infiltrated into the porous host, into the chamber adjacent the host body;

applying an end plate sealing means to the peripheral sealing means so as to completely enclose the chamber, at least a portion of the end plate sealing means being deformable;

placing the press plunger against the end plate sealing means;

heating the metallic material at least to its liquidus temperature;

applying force to the plunger to cause the end plate sealing means to deform towards the host and positively displace the peripheral sealing means, thereby reducing the volume of the chamber and displacing the liquid material into the porous skeleton structure; and

maintaning the force on the plunge until the chamber's volume has been sufficiently reduced to accomplish the desired degree of infiltration.

4,033,401

PRECISION CASTING PROCESS

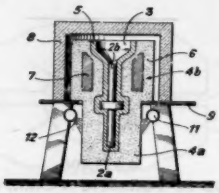
Robert Wlodawer, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 12, 1975, Ser. No. 576,877

Claims priority, application Switzerland, May 29, 1974, 7307/74

Int. Cl.² B22D *27/04*

U.S. Cl. 164—121 5 Claims



1. A precision casting process for producing a casting comprising the steps of

preheating a ceramic casting mold having a differing wall thickness to a temperature above the maximum local casting temperature of the mold;

thereafter cooling a predetermined location in the mold to a predetermined temperature below said maximum casting temperature while allowing the remaining locations in the mold to cool at different rates;

maintaining the temperature of the mold in the desirable direction of solidification of the casting at a decrease of at least 10° C per centimeter of distance from a feed end of the cavity towards an opposite end;

subsequently pouring a molten metal into the mold; and

varying the solidification time of the melt in the mold cavity in the desirable direction of solidification at a controlled rate, the solidification time being lower in the colder portions of the mold than in the warmer portions.

4,033,402

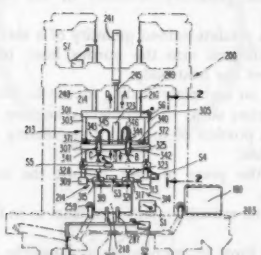
AUTOMATED POST BURN STATION

William J. Eberle, Reading, Pa., assignor to General Battery Corporation, Reading, Pa.

Continuation-in-part of Ser. No. 618,772, Oct. 2, 1975, Pat. No. 3,980,126, which is a continuation-in-part of Ser. No. 432,545, Jan. 11, 1974, Pat. No. 3,954,216, which is a continuation-in-part of Ser. No. 395,528, Sept. 10, 1973, Pat. No. 3,861,575, which is a division of Ser. No. 184,338, Sept. 28, 1971, abandoned. This application Mar. 24, 1976, Ser. No. 669,749

Int. Cl.² B22D *19/04*

U.S. Cl. 164—150 5 Claims



1. An automated apparatus for sequentially forming integrally fused battery terminals on a plurality of storage batteries, each of which comprises at least one battery post element and adjacent bushing element, said apparatus comprising:

a. a frame;

b. a mold means movable between first standby, and second molding positions, said mold means further comprising at least one interchangeable mold and at least one mold carriage block means for establishing a direct heat transfer relationship between said carriage block means and said mold when said mold is disposed in mating engagement with at least a portion of said carriage block means;

c. a burning means for melting and fusing said battery elements; and

d. at least one thermocouple means for directly sensing the temperature of said mold for determining the effectiveness of said heat transfer relationship between said mold and said carriage block means and for preventing said mold means for moving from said molding position to said standby position while said mold exceeds a preselected mold temperature.

4,033,403

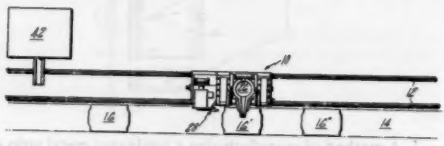
SYNCHRONIZING VELOCITY AND POSITION CONTROL

William W. Seaton, Dexter, and George C. Miller, Ann Arbor, both of Mich., assignors to Seaton Engineering Company, Ann Arbor, Mich.

Filed Sept. 17, 1975, Ser. No. 614,088

Int. Cl.² B22C *25/00*

U.S. Cl. 164—155 20 Claims



1. Apparatus for controlling the velocity and position of movable tool with respect to a moving workpiece comprising:

linkage means, said linkage means including a moving beam and defining a parallelogram;

a workpiece contacting probe mounted on said beam, said probe being movable along an arcuate path;

a first cam, said fist having an operating surface contour which defines a plurality of response zones;

means coupling movements of said linkage means resulting from contact between said probe and a workpiece to said first cam to cause rotation of said first cam;

signal generator means, said signal generator means contacting said first cam operating surface whereby said signal generator provides an output signal which varies in accordance with the rotational position of said cam; and

means responsive to said signal generator means output signal for varying the velocity of the tool.

4,033,404

OSCILLATORY MOLD EQUIPPED WITH A HOLLOW MOLD CAVITY WHICH IS CURVED IN THE DIRECTION OF TRAVEL OF THE STRAND

Markus Schmid, Zurich, Switzerland, assignor to Concast AG, Zurich, Switzerland

Filed Apr. 28, 1975, Ser. No. 571,937

Claims priority, application Switzerland, May 15, 1974, 6694/74

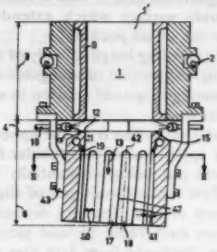
The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.

Int. Cl.² B22D *11/12*

U.S. Cl. 164—260 7 Claims

1. An oscillating continuous casting mold having a hollow mold cavity bounded by four mold walls and which hollow mold cavity is arc-shaped in the direction of travel of the strand for cooling a strand which is forming, two of said mold

walls being operably associated with straight sides of the strand and the other two mold walls being operably associated with the curved sides of the strand, said oscillating continuous casting mold comprising a first cooling device for the indirect cooling of the strand and a second cooling device having substantially strip-shaped support surfaces and intermediately disposed cooling water channels, the width of said cooling water channels increasing in the direction of travel of the



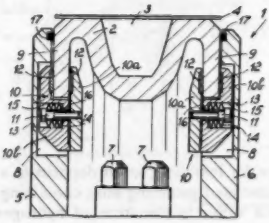
strand, coolant water infeed means provided for said cooling water channels, an intermediate space which is open at all sides disposed between the first cooling device and the second cooling device, the course of the cooling water channels in the second cooling device at both mold walls which are associated with the straight sides of the strand substantially following the arc of the hollow mold cavity in the direction of travel of the strand.

4,033,405

CASTING WHEEL FOR A CONTINUOUS CASTING MACHINE OF THE WHEEL AND BELT TYPE

Giulio Properzi, Via Pietro Cossa, 1, Milan, Italy

Filed Nov. 17, 1975, Ser. No. 632,877
Claims priority, application Italy, Dec. 2, 1974, 30083/74
Int. Cl.² B22D *11/06*
U.S. Cl. 164—278 **5 Claims**



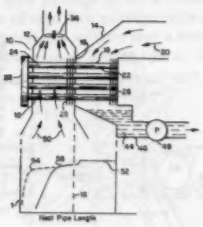
1. A casting wheel for a continuous casting machine of the wheel and belt type, having at least one drive flange and a casting ring mechanically coupled thereto, wherein at least said drive flange comprises a plurality of cavities distributed at its periphery and open towards the interior of the casting wheel, the casting wheel further comprising a plurality of clamp means each housed in a corresponding one of said cavities and each having two spaced apart clamping projections engaging therebetween by friction a peripheral rim of said casting ring and permitting relative movement between said casting ring and said drive flange.

4,033,406

HEAT EXCHANGER UTILIZING HEAT PIPES

Algred Basiulis, Redondo Beach, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 502,594, Sept. 3, 1974, abandoned.
This application July 21, 1976, Ser. No. 707,410
Int. Cl.² F28B *1/06*; F28D *15/00*
U.S. Cl. 165—32 **10 Claims**



7. A dry cooling tower using ambient atmosphere as a cooling medium comprising:

first and second chambers;

means for conveying the cooling medium through said second chamber; and

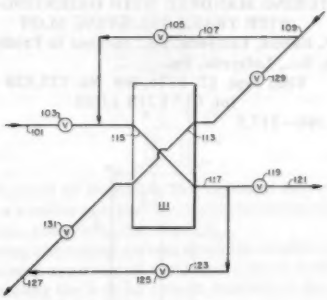
at least one heat pipe having portions extending between said chambers and including means in said second chamber and responsive to temperatures therein for maintaining a preset temperature in said heat pipe portion is said first chamber and for preventing solidification of a fluid to be cooled in said first chamber during temperature changes within a range of temperatures in said second chamber even when the temperature of the cooling medium falls below the temperature at which said fluid to be cooled solidifies.

4,033,407

HEAT EXCHANGER CLEANING SYSTEM

Robert L. Quintilliano, Whitehall, Mich., assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Sept. 2, 1975, Ser. No. 609,864
Int. Cl.² F28F *27/02*
U.S. Cl. 165—95 **9 Claims**



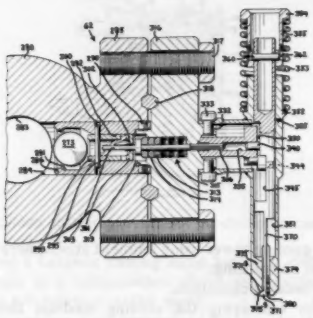
8. In a method for operating a titanium plate heat exchanger through which pass in heat exchange relationship a first liquid comprising an acidulated solution of chlorine in water and a second liquid comprising brine, the improvement wherein said first liquid is introduced into and conducted from said heat exchanger through thermoset unsaturated polyester resin piping and is periodically passed into the region of said heat exchanger wherein said second liquid is normally passed for sufficient time to remove scale produced by said second liquid.

4,033,408

GO-DEVIL STORAGE AND DISCHARGE ASSEMBLY

John V. Fredd, Dallas, Tex., and William G. Hill, Lake Charles, La., assignors to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 516,205, Oct. 21, 1974, Pat. No. 3,955,624. This application Mar. 18, 1976, Ser. No. 668,269
Int. Cl.² E21B *23/00, 43/12*
U.S. Cl. 166—75 R **5 Claims**



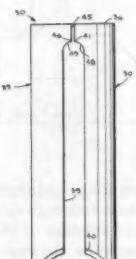
3. A go-devil storage and discharge assembly for use in a well system including a go-devil actuated well safety valve, said storage and discharge assembly comprising: a body having a first bore communicating with the bore through said flow conductor when said body is connected with said flow conductor and said body having a second bore communicating with said first bore for housing a go-devil; a go-devil pusher in said second bore adapted to move in said second bore in a direction to push a go-devil from said second bore into said first bore; means connected between said pusher and said body for moving said pusher linearly in response to rotation of said pusher; an operating rod extending into said second bore and connected with said pusher for actuating said pusher responsive to a rotational motion only of said operating rod; and means supported on said body and coupled with said operating rod for rotating said operating rod responsive to a predetermined well system operating condition.

4,033,409

WELL TUBING MANDREL WITH ORIENTING SLEEVE WITH TRASH RELIEVING SLOT

Gerald P. Hebert, Lafayette, La., assignor to Production Specialties, Inc., Lafayette, La.

Filed Sept. 13, 1976, Ser. No. 722,520
Int. Cl.² E21B *23/00*
U.S. Cl. 166—117.5 **2 Claims**



1. In a mandrel for use in a well tubing in which the mandrel body has an open bore for alignment with the well tubing and a pocket offset from the open bore for flow control devices, the invention comprising:

a. an orienting sleeve in the open bore above the pocket for aligning a flow control device to be positioned in the pocket, said orienting sleeve including:

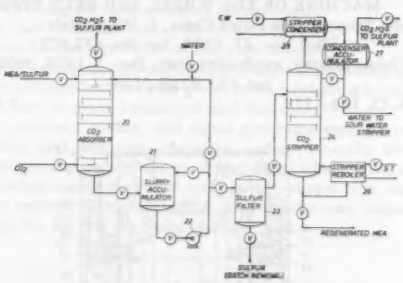
1. an elongated hollow tubular body having an upper and lower end;
2. said lower end extending upwardly at an angle relative to the longitudinal axis of said tubular body to form a sloping guide surface which extends upwardly and away from the offset pocket;
3. a first slot extending longitudinally of said tubular body from the highest portion of said guide surface, said first slot terminating in spaced relation to said upper end of said tubular body;
4. a second slot extending from the upper end of said first slot to the upper end of said tubular body; and
5. said second slot being substantially smaller in width than said first slot to form a pair of aligned shoulders at the juncture of said first and second slot which are spaced from each other by said second slot whereby debris may discharge from said first slot through said second slot and into the tubing.

4,033,410

MONOETHANOLAMINE PROCESS FOR SULFUR REMOVAL FROM CIRCULATING OIL USED IN SOUR GAS WELLS

David Kauffman, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 20, 1976, Ser. No. 659,862
Int. Cl.² E21B *43/00*; B01D *53/34*
U.S. Cl. 166—244 C **5 Claims**



1. A process for inhibiting sulfur deposits in a hydrocarbon gas well or associated gathering lines containing hydrocarbon gas laden with sulfur in the form of hydrogen sulfide and dissolved elemental sulfur, comprising, contacting the hydrocarbon gas with oil in the well or gathering lines, absorbing the sulfur into the oil, removing the oil from the well or gathering lines, contacting the oil with an aqueous solution of an organic amine, dissolving the sulfur from the oil into the organic amine solution, separating the oil and organic amine solution, and regenerating the organic amine solution after contact with the oil by precipitating sulfur from the organic amine solution with CO_2. .

2. A process for separating dissolved sulfur from aqueous organic amine solution comprising contacting the solution with CO_2 to precipitate the sulfur and separating the organic amine solution and precipitated sulfur.

4,033,411

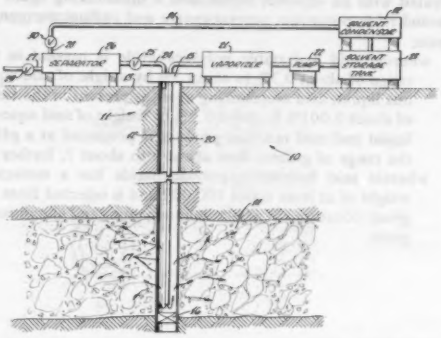
METHOD FOR STIMULATING THE RECOVERY OF CRUDE OIL

John T. Goins, 2301 Nassau Drive, Seabrook, Tex. 77586

Continuation-in-part of Ser. No. 547,355, Feb. 5, 1975, abandoned. This application Jan. 2, 1976, Ser. No. 646,253

Int. Cl.² E21B 43/24

U.S. Cl. 166—257 13 Claims



1. A method for stimulating the recovery of crude oil from a formation which is penetrated by a well bore, wherein a mixture of vapors of a solvent for the crude oil and gas which is a product of combustion of injected into the formation.

4,033,412

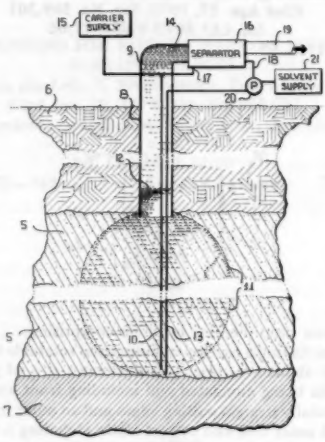
FLUID CARRIER RECOVERY SYSTEM AND METHOD

George M. Barrett, R.R. No. 5, Galt, Ontario, Canada

Filed June 18, 1976, Ser. No. 697,447

Int. Cl.² E21B 43/12, 43/22, 39/00

U.S. Cl. 166—267 12 Claims



1. A method of recovering oil and the like from an underground source wherein the oil is deposited in an unpumpable form, said method comprising the steps of providing a flow passage down to an upper part of the oil deposit, flowing a liquid carrier into the oil deposit generally in alignment with and below said flow passage until a large volume of the oil deposit below the flow passage is filled with the carrier and the carrier reaches a predetermined level within the flow passage above the oil deposit, and then flowing a solvent for the oil into the volume of the oil deposit filled by the carrier, the solvent having a specific gravity less than the carrier and when combined with oil having a specific gravity less than the carrier whereby as mixtures of oil and solvent are formed the mixtures will float to the surface of the carrier within the flow passage for recovery.

10. Apparatus for recovering oil and the like from an underground source wherein oil is deposited in an unpumpable form, said apparatus comprising means for defining a flow passage generally from the surface of the earth to an upper portion of the source, carrier supply means for flowing a liquid carrier into a lower portion of the source generally in vertical alignment with the flow passage to fill a volume of the source and a major portion of said flow passage with a carrier, solvent supply means for directing a solvent into a lower portion of the volume, and collector means connected to the upper end of said flow passage for receiving an oil-solvent mixture floating on the carrier within said flow passage.

4,033,413

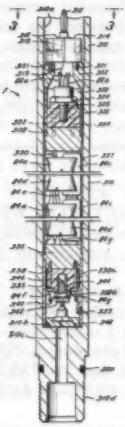
WIRE LINE WELL TOOL AND METHOD

Austin S. Rogers, Houston, Tex., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 465,081, April 29, 1974, Pat. No. 3,942,373. This application Dec. 4, 1975, Ser. No. 637,676

Int. Cl.² E21B 47/02, 47/06, 47/12

U.S. Cl. 166—301 5 Claims



1. A method of increasing the electrical current level to energize a wireline operated stuck pipe loosening apparatus in a well bore, comprising the steps of:

a. sending alternating current down the wireline to the pipe loosening apparatus at a reduced current level;

b. increasing the level of current received at the apparatus from the wireline; and

c. energizing the pipe loosening apparatus with the increased current.

2. In an apparatus for loosening pipe which is stuck in a well bore when energized by an electrical current over a wireline from the surface, the improvement comprising:

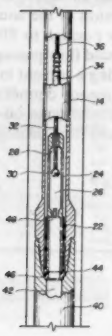
means in said apparatus receiving the electrical current from the wireline and for increasing the level of current sufficiently to energize said apparatus, whereby reduced current levels may be sent from the surface, and whereby power loss in the wireline is reduced.

4,033,414

METHOD AND APPARATUS FOR RELEASING A DRILL STRING HELD BY DIFFERENTIAL PRESSURE

Michael F. Stroble, 1610 Pine Chase, Houston, Tex. 77055

Filed Aug. 2, 1976, Ser. No. 710,610
Int. Cl.² E21B 31/00, 33/128, 41/00
U.S. Cl. 166—301 10 Claims



1. A method of releasing a portion of a drill string that is stuck in a well bore due to differential pressure holding it against the wall of the well bore, comprising the steps of placing a seal between the drill string and the well bore to prevent the downward flow of fluid in the annulus above the seal and lowering the fluid level in the drill string to release the pressure differential holding the stuck portion until it can be pulled free of the wall of the well bore.

3. Apparatus for recovering a drill string held against the wall of a well bore by differential pressure sticking, comprising means providing a seal between the drill string and the well bore above the stuck portion and means for lowering the level of drilling fluid in the drill string to reduce the hydrostatic pressure of the drilling mud sufficiently to allow the pipe string to be moved away from the wall of the well bore.

4,033,415

METHODS FOR FRACTURING WELL FORMATIONS

Marlin D. Holtmyer; Charles J. Githens, and John M. Tinsley, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Division of Ser. No. 346,546, March 30, 1973, which is a continuation-in-part of Ser. No. 98,157, Dec. 14, 1970, abandoned, which is a continuation-in-part of Ser. No. 881,314, Dec. 1, 1969, abandoned. This application Oct. 14, 1976, Ser. No. 732,247
Int. Cl.² E21B 43/26
U.S. Cl. 166—308 30 Claims

1. A method of fracturing a subterranean formation penetrated by a well bore which comprises introducing a crosslinked aqueous fracturing gel into said formation through said well bore at a rate sufficient to fracture said formation wherein said fracturing gel consists essentially of the reaction product of a hydratable polysaccharide, which has been hydrated with an aqueous liquid, and a crosslinking agent;

wherein said hydratable polysaccharide is present in the range of about 0.3% by weight of said aqueous liquid, said crosslinking agent is present in the range of about 0.001% to about 0.5% by weight of said aqueous liquid and said reaction product is produced at a pH in the range of about 1.5 to about 5.5; further

wherein said hydratable polysaccharide has a molecular weight of at least about 100,000 and is selected from the group consisting of galactomannan gums, glucomannan gums and cellulose derivatives having hydrophillic constituents; and still further

wherein said crosslinking agent is selected from compounds which will provide antimony (V) ions.

8. A method of fracturing a subterranean formation penetrated by a well bore which comprises introducing a crosslinked aqueous fracturing gel into said formation through said well bore at a rate sufficient to fracture said formation wherein said fracturing gel consists essentially of the reaction product of a hydratable polysaccharide, which has been hydrated with an aqueous liquid, and a crosslinking agent selected from potassium permanganate and sodium permanganate;

wherein said hydratable polysaccharide is present in the range of about 0.3% to about 3% by weight of said aqueous liquid, said crosslinking agent is present in the range of about 0.001% to about 0.5% by weight of said aqueous liquid and said reaction product is produced at a pH in the range of greater than about 5 to about 7; further

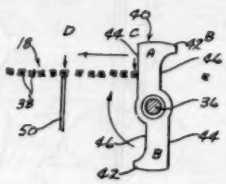
wherein said hydratable polysaccharide has a molecular weight of at least about 100,000 and is selected from the group consisting of galactomannan gums and glucomanan gums.

4,033,416

BLADE MEANS FOR ROW CROP THINNING MACHINE

Henry K. Orthman, Lexington, Nebr., assignor to Orthman Manufacturing, Inc., Lexington, Nebr.

Filed Apr. 17, 1975, Ser. No. 569,301
Int. Cl.² A01B 41/04, 41/06
U.S. Cl. 172—61 3 Claims



1. A row crop thinning machine comprising,

a frame having a horizontally disposed rotatable blade rotatable about a vertical axis adjacent a row of plants, said blade being elongated and including front and rear substantially straight cutting edges and an outer free end, and said outer free end of said blade including a tail portion extending rearwardly and perpendicularly of said rear cutting edge through and beyond the vertical plane containing said rear cutting edge,

means for moving said blade forwardly along said row with said blade being positioned in said row for cutting engagement of said front cutting edge with some of said plants,

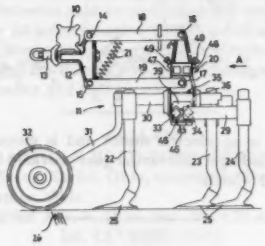
power means for intermittently rotating said blade rearwardly in said row for cutting engagement of said rear cutting edge with others of said row of plants and to a position in said row ahead of an uncut plant with said tail portion extending rearwardly along said uncut plant on the side of the uncut plant furthest from said vertical axis of rotation.

4,033,417

AGRICULTURAL MACHINE

Willy Rau, Weilheim, Teck, and Christian Taus, Kirchheim, Teck, both of Germany, assignors to Maschinenfabrik Rau oHG, Wilheim, Teck, Germany

Filed Apr. 2, 1975, Ser. No. 564,442
Claims priority, application Germany, Apr. 10, 1974, 2417496; Sept. 12, 1974, 7430647
Int. Cl.² A61B 65/00
U.S. Cl. 172—613 13 Claims



2. In an agricultural machine, a combination comprising support means having a passage; a plurality of agricultural tools; mounting means mounting said tools on said support means with freedom of adjustment to respective selected positions, said mounting means comprising at least one bar-shaped mounting member received in said passage; a wedge-shaped member having wedge faces extending into said passage transversely of the elongation thereof; and a single arresting element for arresting all of said tools in their respectively selected positions, said aresting element pressing said mounting member against one of said wedge faces.

4,033,418

TINE MOUNTING FOR ROTARY HARROW INCLUDING U-SHAPED RECESS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Jan. 29, 1975, Ser. No. 545,037
Claims priority, application Netherlands, Jan. 31, 1974, 7401323
Int. Cl.² A01B 15/00
U.S. Cl. 172—763 7 Claims

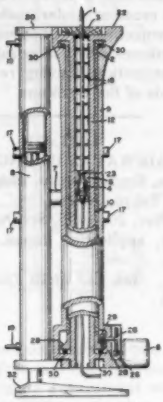
1. A tine mounting for a rotary harrow including a generally horizontal support with at least one tine holder on said support, a tine having a fastening portion and said portion being fitted in an internal bore of said holder, said fastening portion having at least one recess, said recess, viewed lengthwise of the longitudinal axis of said fastening portion, being substantially U-shaped, tightening means on said mounting and said tightening means engaging a flat wall of said U-shaped recess and urging the said fastening portion into tight engagement with said bore.

4,033,419

VIBRATOR AND PUSHING APPARATUS FOR DRIVING METAL PINS IN ROCK FACES IN MINES

James R. Pennington, Basking Ridge, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 4, 1973, Ser. No. 347,936
Int. Cl.² E21D 20/00
U.S. Cl. 173—34 8 Claims



1. An apparatus for driving metal pins into a rock face in an underground mine, comprising:

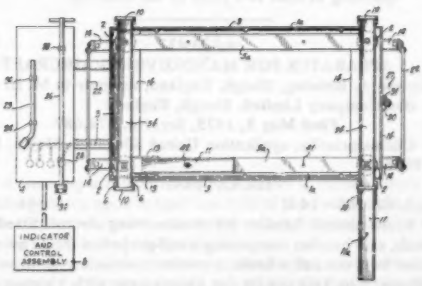
a. a housing with an inner cylindrical surface;
b. a hollow cylinder adapted for receiving a pin in its upper open end, said cylinder being concentrically disposed for rotation within the housing, with its outer surface contiguous with the inner surface of the housing, said hollow cylinder having a female thread extending substantially throughout its full length;
c. means for rotating the rotatable cylinder;
d. a movable driving member disposed within the rotatable cylinder on which the head of the pin rests, said member having a male thread for cooperative engagement with the female thread of the rotatable cylinder;
e. vibrating means incorporated into the movable driving member; and
f. means for preventing rotation of the driving means.

4,033,420

WEIGHING SCALE

James J. De Masters, Elmhurst, N.Y., assignor to Brookline Instrument Company, Inc., Wallingford, Conn.

Filed May 20, 1976, Ser. No. 688,321
Int. Cl.² G01G 21/00, 19/03; B62D 21/14
U.S. Cl. 177—126 12 Claims



1. A scale for weighing a wheeled load, comprising:

a. a frame for supporting the load during weighing, including rails for receiving and guiding the wheels;
b. ramps for supporting and guiding the wheels during movement of the load onto the rails;
c. load cell means supporting said frame and any load thereon;
d. indicator means operated by the load cell means; and
e. means for removably connecting one end of each ramp to one end of each rail, said removable connecting means comprising a crossbar under each rail adjacent an end thereof and projecting from opposite sides thereof, and a pair of projections on the outer sides of one end of each ramp, said projections having recesses to engage the projecting ends of the crossbars.

4,033,421

STAIRWAY-CLIMBING CART

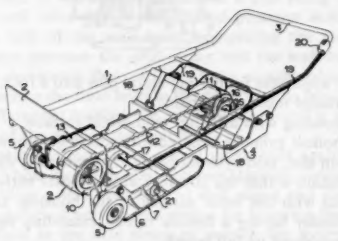
Yasuaki Ikarimoto, Sendai, Japan, assignor to Sunwa Sharyo Mfg. Co., Ltd., Tokyo, Japan

Filed Nov. 20, 1975, Ser. No. 633,915

Claims priority, application Japan, Nov. 26, 1974, 49-143654[U]

Int. Cl.² B62B 5/02

U.S. Cl. 180—8 A **6 Claims**



1. A stairway climbing cart comprising
a carrier frame defining sides thereof having front portions,
a pair of front wheels having a tread and disposed in front portions of both sides of said frame,
a pair of sledge members disposed at the sides of said frame substantially laterally extending away from said frame beyond said wheels adjacent said front wheels, respectively, and elongated rearwardly, said sledge members including slipping surface means at a lower surface thereof for slidably contacting steps of a stairway during a climbing operation,
a driving belt crawler disposed in a central portion of said carrier frame and having a driving wheel, a driven wheel and an endless belt operatively engaged with said driving and driven wheels, and having a crawling surface of said endless belt positioned at a slightly lower level than that of said tread of said front wheels, and being rearwardly retracted from said front wheels, and having a length spanning at least two steps of the stairway.

4,033,422

APPARATUS FOR MANOEUVRING AIRCRAFT

Vernon A. Benning, Slough, England, assignor to M. L. Aviation Company Limited, Slough, England

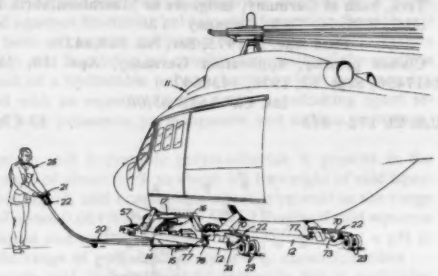
Filed May 5, 1975, Ser. No. 574,687

Claims priority, application United Kingdom, May 6, 1974, 19858/74

Int. Cl.² B64F 1/22

U.S. Cl. 180—14 C **16 Claims**

1. An aircraft handler for manoeuvring aircraft fitted with skids, said handler comprising a self-propelled frame having at least two coaxial wheels, a motor connected to drive said wheels, a jacking system for engagement with a strong point on the underside of said aircraft, a steering arm which extends rigidly from one end of said frame and controls for said driving motor and jacking system, said controls being located at the end of said arm remote from said frame, and wherein said



driving motor is an electric motor and is mounted on said frame, and including a differential gear provided between said motor and said wheels.

4,033,423

HYDRAULIC HEIGHT-ADJUSTMENT VEHICLE SUSPENSION

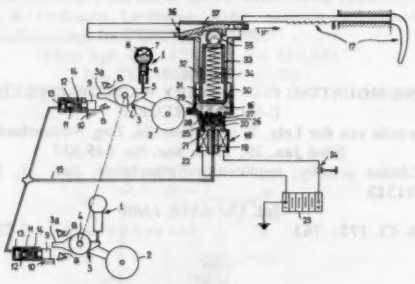
Albert Grosseau, Paris, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France

Filed Nov. 17, 1975, Ser. No. 632,721

Claims priority, application France, Nov. 25, 1974, 74.38567

Int. Cl.² B60G 17/00

U.S. Cl. 180—41 **5 Claims**



1. In a vehicle of the type including a chassis, a hand brake control operably movably from a non-brake applying position to a brake applying position, a suspension system including at least one suspension member movable with respect to said chassis, and means for blocking-up said suspension system to prevent said suspension system from collapsing when the vehicle is stationary for a prolonged period of time; the improvement wherein said blocking-up means comprises:
a retractable buffer movable from a first retracted position to a second blocking position between a portion of said chassis and said suspension member;
first spring means urging said buffer to said retracted position;
hydraulic receiver means, acting against the force of said spring means, for receiving therein hydraulic fluid and for moving said buffer against said first spring means into said blocking position;
a hydraulic control chamber having therein hydraulic fluid and being in fluid communication with said receiver means;
a movable member mounted in said control chamber;
second spring means, mounted between said movable member and said hand brake control, for biasing said movable

member into said control chamber against said hydraulic fluid within said control chamber; and

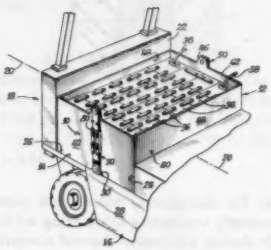
actuator means, operably associated with said hand brake control, for, upon movement of said hand brake control to said brake applying position thereof, moving said second spring means and thereby said movable member toward said control chamber, thereby forcing hydraulic fluid from said control chamber into said receiver means, and thus moving said buffer against said force of said first spring means into said blocking position, said vehicle further including an ignition circuit having an ignition switch, and further comprising a solenoid valve positioned between said control chamber and said receiver means, said solenoid valve having a coil which is part of said ignition switch circuit of the vehicle, said solenoid controlling the flow of hydraulic fluid between said control chamber and said receiver means.

4,033,424

ARTICLE HOLD-DOWN DEVICE

Dafydd W. Evans, Euclid, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Apr. 9, 1976, Ser. No. 675,428
Int. Cl.² B60R *18/02*
U.S. Cl. 180—68.5 **8 Claims**



1. An article hold-down device for restraining movement of an article away from a supporting platform, comprising:

a lower clamping member having a plurality of serrations and being connected to the platform;

an upper clamping member having a plurality of serrations connected to the article;

a releasable coupling element slidably movable along the clamping members between a released position at which the serrations of the clamping members are spaced apart and the upper clamping member is movable relative to the platform and a locking position at which the serrations of the clamping members are interlockingly engaged and the upper clamping member is maintained at a preselected position relative to the platform; and

cam means effective in the locking position of the coupling element and interacting between the coupling element and the clamping members for resiliently biasing the clamping members together and restraining movement of the article.

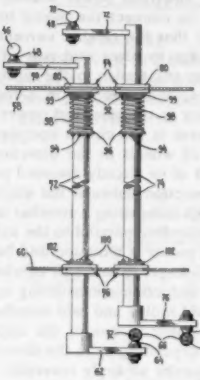
4,033,425

VEHICLE CONTROL SYSTEM

Otto Mueller, Jr., Detroit, Mich., assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Dec. 22, 1975, Ser. No. 643,418
Int. Cl.² B60K *26/00*
U.S. Cl. 180—77 R **10 Claims**

1. A control system for a vehicle having an operators station including an apertured partition resiliently supported relative to the vehicle chassis, the combination of; a movable control member at one side of said partition, a mechanism to be controlled at the other side of said partition, a shaft passing through an aperture in said partition, mounting means on said partition supporting said shaft for rotational and axial movement, said mounting means including a bearing element engagable with said shaft and a resilient seal disposed between said bearing element and said partition, stop means on said shaft engagable with said bearing element to limit axial movement



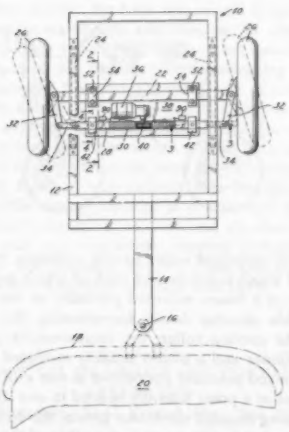
of said shaft in one direction relative to said partition, resilient means urging said shaft in said one direction to maintain said bearing element in sealing engagement with said seal, and means connecting said shaft to said control member and to said mechanism to transmit movement of said control member to said mechanism.

4,033,426

APPARATUS FOR STEERING TRAILER VEHICLES

Eugene J. Williams, 109 Detroit Ave., Trenton, Mich. 48183

Filed Jan. 15, 1976, Ser. No. 649,529
Int. Cl.² B62D *5/04*
U.S. Cl. 180—79.1 **8 Claims**



1. A steering and control apparatus for a trailer having a frame supported upon at least one axle of the trailer and a pair of wheels pivoted thereto, the trailer adapted to be coupled to a towing vehicle, and comprising:

a reversible electric motor mounted upon said axle and operably connected to said pair of wheels for turning the same toward one side or the opposite side of the trailer;

an electric circuit connected at one end to the electric

motor and connectable at the other end to the electrical power source of the towing vehicle;

switch control means incorporated into said circuit and mounted upon the towing vehicle, said switch control means being operable in one position to disconnect the motor from the electrical power source, operable in a second position to connect the motor to the electrical power source so that the electric current in the circuit operates the motor to pivot said pair of wheels in the direction to steer the trailer to the right of its already assumed position, and operable in a third position to connect the motor to the electrical power source so that the electric current in the circuit operates the motor to pivot said pair of wheels in the direction to steer the trailer to the left of its already assumed position;

said operable connection between the electric motor and said pair of wheels comprising a member movable along a path of travel extending parallel to the axle of the trailer upon which the motor is mounted and being connected by mechanical linkages to said pair of wheels to turn the same, and gear reduction means being operatively coupled between said motor and said member for effecting travel of the member in one or the opposite direction along said path depending upon the direction of rotation of the motor thereby to apply reversible turning movement to said pair of wheels;

said movable member being in the form of a rack bar having its teeth operatively engaged with a gear of said gear reduction means; and

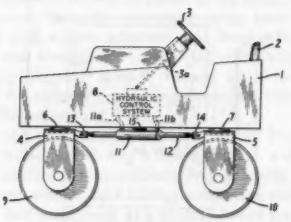
springs means interposed between the trailer frame and the trailer axle for yieldingly supporting the frame from said pair of wheels, and an approximately horizontal extending supporting plate mounted to said axle for serving as a common support for said motor and said rack bar.

4,033,427

STEERING APPARATUS FOR ROAD ROLLERS

Rune Sturesson, Lyckeby, Sweden, assignor to Dynapac Maskin AB, Solna, Sweden

Filed Dec. 10, 1975, Ser. No. 639,282
Int. Cl.² B62D 5/06
U.S. Cl. 180—140 **3 Claims**



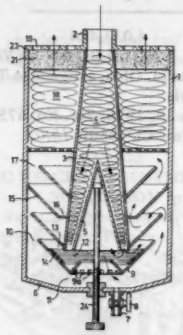
1. In a self-propelled roller having a chassis, two drums at least one of which is driven and each of which is journalled so as to rotate in a frame mounted pivotally on the chassis, and an actuatable steering device for selecting the direction of travel of the moving roller, the improvement comprising a steering cylinder and a piston slidably mounted in the cylinder, a piston rod pivotally connected at one end to one of the drum frames at a point laterally spaced in one direction from an axis passing through the frame pivots, the rod being pivotally connected at its other end to the other of the drum frames at a point laterally spaced in the opposite direction from the frame pivot axis, the piston rod being connected to the piston and passing through said steering cylinder, bearing means pivotally mounting the steering cylinder to the chassis, a control system for transmitting and receiving a pressure medium through a pair of lines, said lines being connected to the cylinder and conveying the pressure medium to opposite sides of the piston, the control system being responsive to actuation of the steering device to supply the pressure medium selectively through said lines to the steering cylinder to cause movement of the piston in the cylinder whereby the piston rod causes simultaneous rotation of the drum frames and proper tracking of the drums.

4,033,428

MUFFLER FOR INTERMITTENT BLASTS OF AIR FROM PNEUMATIC TOOLS, VALVES AND THE LIKE

Karl Filip Wennerstrom, Stockholm, Sweden, assignor to Ab Fi-Wes Maskinservice, Stockholm, Sweden

Filed Dec. 9, 1975, Ser. No. 639,050
Claims priority, application Sweden, Dec. 11, 1974, 7415563
Int. Cl.² F01N 3/06
U.S. Cl. 181—36 C **16 Claims**



1. A muffler for dampening noise from pneumatic tools while simultaneously separating lubricating oil from the used compressed air during expansion thereof comprising

a container having an inlet and an outlet for the air;

a tube for guiding the air from said inlet into said container;

an oil-separating plate aligned with the inner end of said tube for impingement thereon by the incoming air and altering the direction of the air flow for extracting a substantial portion of the oil from the air;

labyrinth means for guiding said air flow from said plate toward said outlet, and

filter means positioned in said passage and between said labyrinth means and said outlet for passing of the air therethrough for removal of oil from the air before discharge of the air to the atmosphere.

4,033,429

DOWNHOLE SEISMIC SOURCE

John B. Farr, Kouston, Tex., assignor to Standard Oil Company (Indiana), Chicago, Ill.

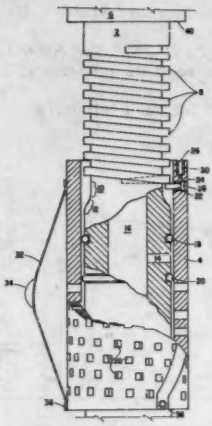
Filed Feb. 18, 1976, Ser. No. 659,072
Int. Cl.² G01V 1/04, 1/40
U.S. Cl. 181—106 **12 Claims**

1. A seismic signal source for use in a borehole comprising:

a section of drill pipe having a rotary cam on its outer surface and also having a port from the center to the outer surface of the section;

a cylindrical sleeve positioned on a portion of said drill pipe section and having an inner diameter larger than the outer diameter of said drill pipe section, said sleeve having a cam follower for engagement with the cam in said drill pipe section to cause said sleeve to move axially a preselected distance relative to said drill pipe in response to rotation of said drill pipe, and said sleeve having a plurality of ports from its inner to outer surfaces, said ports spaced to pass sequentially by said drill pipe section port as said sleeve moves axially on said drill pipe; and,

rotation preventing means attached to said sleeve and extending therefrom to contact a borehole wall for resisting



rotation of said sleeve while allowing axial movement of said sleeve.

4,033,430

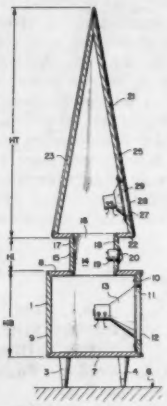
SPEAKER ENCLOSURE

Edward J. Bolden, Bronx, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 9, 1976, Ser. No. 694,088

Int. Cl.² H05K *5/00*; A47B *81/06*

U.S. Cl. 181—144 **2 Claims**



1. A speaker enclosure, comprising

a substantially rectangular parallelipiped base cabinet mounted on legs supporting it at a predetermined distance above a supporting surface, said base cabinet having a bottom, a top spaced from and parallel to the bottom and four sides perpendicular to the top and bottom, a side hole formed through one of the sides and covered by a grill and accommodating a full range speaker and a top hole formed through the top;

a substantially rectangular parallelepiped intermediate cabinet of smaller dimensions than the base cabinet mounted on said base cabinet, said intermediate cabinet having an open bottom, an open top and four sides perpendicular to the top of the base cabinet and surrounding the top hole of the base cabinet and a side hole formed through one of the sides for accommodating a tweeter control; and

a substantially pyramidal top cabinet mounted on the intermediate cabinet and having a bottom and four triangular sides, a bottom hole formed through the bottom and coincident with the open top of the intermediate cabinet and a side hole formed through one of the sides and covered by a grill and accommodating a tweeter.

4,033,431

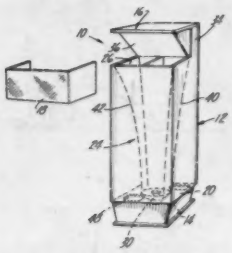
ACOUSTIC CROSSOVER SPEAKER ENCLOSURE

James G. Ebejer, 4951 Bantry, West Bloomfield, Mich. 48033

Filed Nov. 19, 1975, Ser. No. 633,371

Int. Cl.² G10K *9/14*, *11/10*

U.S. Cl. 181—152 **2 Claims**



1. A speaker enclosure comprising:

an enclosed cabinet disposed in an upright position having an opening at the top end;

a horn disposed in an upright position within said cabinet, said horn having a throat opening at the near bottom end of said cabinet, said horn having a mouth opening through said top end of said cabinet, the exterior walls of said horn and the interior wall of said cabinet defining an annular air chamber extending 360° around said horn exterior walls and substantially along the full length of said horn between said throat, and means mounting said horn in said cabinet to define said 360° annular air chamber; and

a driver carried at the throat end of said horn such that the front of said driver projects therein for radiating compression waves therein, the back side of said driver projecting compression waves into said annular air chamber, said cabinet having a back wall with a port extending therethrough, said air chamber communicating the sound waves radiated from the rearward side of said driver to said port; a deflection panel carried at the top end of said cabinet adjacent the mouth of said horn such that sound waves emitted from the mouth of said horn are laterally deflected by said deflection panel for deflecting the sound from the front of said cabinet into the listening area, whereby the energy emitted in a rearward direction by said driver is communicated via said air chamber to said port to add said rearwardly emitted radiation of said driver to the radiation emitted from the front of said driver which is directed through said horn.

4,033,432

CRANKCASE OIL DRAINAGE AND CONTAINMENT APPARATUS

Bertram J. Bernstein, 3144 Briand Ave., San Diego, Calif. 92122

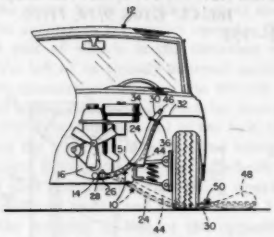
Filed Aug. 29, 1975, Ser. No. 609,110

Int. Cl.² F01M *11/04*

U.S. Cl. 184—1.5 **3 Claims**

1. Method for draining an automotive crankcase utilizing a flow through nipple for threaded attachment to the outlet of said crankcase, said nipple having an outlet enabling an unrestricted flow of oil therethrough, a long flexible drainage hose, said drainage hose connected to said nipple at one end and a

free end of sufficient length so as to be able to project upwardly through the engine compartment to a stored elevated position where it is conveniently accessible to the user when the hood of the vehicle is open, attachment means for releasably securing said free end of said hose being within said engine compartment above the oil level in said crankcase and a retrieval line connected to said free end of said hose, the length of which is at least substantially the height between the securing means and ground level, said method comprising the steps of:



releasing said free end of said hose from said attachment means;

attaching a container in a sealed relationship with said free end of said hose prior to lowering to a drain position;

lowering said free end of said hose to a position below said crankcase;

allowing all of said oil to drain from said crankcase;

removing said container when all of said oil is drained from said crankcase; and

returning said free end of said hose to said stored position.

4,033,433

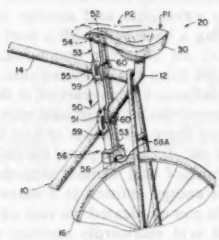
BODY MOTION BICYCLE SEAT BRAKE

Norbert A. Kirk, 2970 Sheridan Road, Chicago, Ill. 60657

Filed Oct. 18, 1976, Ser. No. 733,401

Int. Cl.² B62L *1/04*

U.S. Cl. 188—25 **10 Claims**



1. In a bicycle having a frame which includes a seat tube, and a rear wheel mounted in the frame, a body motion seat brake system comprising a seat, resilient means for mounting said seat on the seat tube such that at least the forward end of said resilient means may be deflected downwardly by the action of a rider shifting his weight forwardly relative to said forward end, and an elongated brake member having means for pivotably mounting one end thereof to said forward end of said resilient means and for mounting said brake member at an intermediate location thereof on the seat tube, such that the distal end of said brake member is disposed in spaced proximity to the rear wheel when said forward end of said resilient means is in a relatively undeflected position and is urged into abutting, braking relationship with the rear wheel when said forward end of said resilient means is deflected as a result of a forward shift of the rider's weight.

4,033,434

SELF ADJUSTING BRAKE SYSTEM

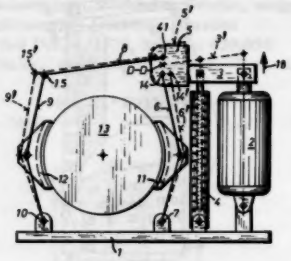
Helmut Henrich, Burbach-Niederdresselndorf, Germany, assignor to Firma Siegerland-Bremsen, Haiger-Rodenbach, Germany

Filed Feb. 26, 1976, Ser. No. 661,753

Claims priority, application Germany, Feb. 26, 1975, 2508240

Int. Cl.² F16D *49/16*

U.S. Cl. 188—75 **9 Claims**



1. A brake system comprising a pivotally mounted operating lever, first and second brake levers each having a brake shoe thereon acting in opposed relationship against a brake drum and having one end thereof pivotally mounted, the other end of said first brake lever being pivotally connected to said operating lever and rod means pivotally connected between the other end of said second brake lever and said operating lever such that pivoting of said operating lever in one direction applies said brake shoes and pivoting in the other direction releases said brake shoes, means connected to said operating lever for actuating said operating lever in the non-braking direction, spring means acting to pivot said operating lever to apply said brake shoes, and means on said rod means and operating lever for adjusting the length of said rod means when said operating lever is moved in one direction in response to wear of said brake shoes, said adjusting means comprising uni-directional drive means on said rod means at its end connected to said operating lever such that rotation of said drive means in one direction increases the effective length of said rod means, an actuating lever extending from said drive means, and first and second opposed cams on said operating lever engageable with said drive means actuating lever upon pivoting of said operating lever.

4,033,435

RETAINER MECHANISM FOR VEHICLE BRAKE ACTUATORS

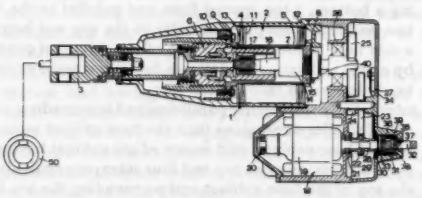
John Patrick Bayliss, Redditch, England, assignor to Girling Limited, Birmingham, England

Filed Sept. 30, 1975, Ser. No. 618,227

Claims priority, application United Kingdom, Oct. 16, 1974, 44744/74

Int. Cl.² B60T *13/04*

U.S. Cl. 188—173 **5 Claims**



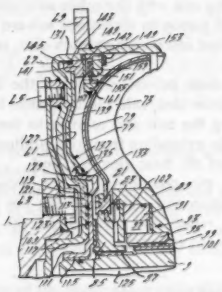
1. In a brake actuator for a vehicle comprising a brake

applying mechanism for applying a brake, pre-load resilient means acting on said mechanism to apply said brake, a retractable carrier on which said resilient means is mounted, a nut coupled to said carrier, means preventing relative rotation of said nut and said carrier, a threaded spindle engaging threadably with said nut, and retainer means for holding said pre-load resilient means in a retracted compressed energy-storing position when the brake is in an off position and releasable to release said resilient means when the brake is to be applied, said retainer means comprises an electric motor operable in response to an operational voltage to urge said resilient means into said retracted energy-storing position and to retain said resilient means in the said retracted position, and a reduction gearing arrangement, said spindle being coupled to said gearing arrangement, and said electric motor acting on said spindle through said gearing arrangement whereby rotation of said spindle acts through said nut to impart axial movement to said carrier.

4,033,436
TRANSMISSION AND TORQUE CONVERTER WITH LOCK-UP CLUTCH

Robert Arthur Hoetger, St. Clair Shores; James Albert Hagaman, Madison Heights, and William Nortman, Grosse Pointe, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed May 12, 1975, Ser. No. 576,402
Int. Cl.² F16H *41/18*
U.S. Cl. 192—3.3 **9 Claims**

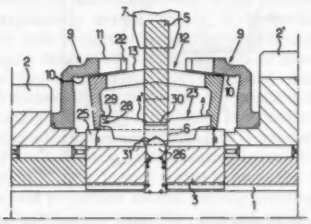


1. A power transmission unit for a motor vehicle comprising a driving member (1), a hydrokinetic torque converter having an impeller wheel (71), means (61, 67) drivingly connecting said driving member to said impeller wheel, an input shaft (9), an output shaft (43), a planetary gear train (13, 15) drivingly connecting said output shaft, a runner wheel (73), means (85, 87) drivingly connecting said runner wheel to said input shaft, a guide wheel (75), a sleeve (101 surrounding said input shaft, a one-way brake device (93) located between said sleeve and said guide wheel, and lock-up clutch means (109, 147 – 161) adapted to positively connect the impeller wheel to the runner wheel, said means drivingly connecting said driving member to said impeller wheel including a casing (71) having a first annular plate means (121) extending generally radially with respect to the axis of rotation of said driving member, a second annular plate means (67, between 131 and 133) extending generally radially and offset forwardly with respect to said vehicle from said first annular plate means, an anular axially extending shoulder (129) connecting said first and second annular plate means, and an annular axially extending cylinder wall portion (131) extending rearwardly with respect to said vehicle from the outer periphery of said second annular plate means, said lock-up clutch means including an annular support plate (109) secured to the rearward face of said first annular plate means (121), said annular support plate having a forwardly extending annular flange (133) forming an annular, axially extending clinder wall portion, at last one of said annular support plate and said first annular plate means having a recess (123) therein extending from the radially inner edge of the junction thereof to the radially outer edge of the juncture thereof, said clinder wall portions (131, 133) and said second annular plate portion forming a cylinder (127), first annular clutch disc means (147) drivingly connected to said casing, and second annular clutch disc means (155) drivingly connected to said runner wheel, an annular piston (137) in said cylinder adapted to move rearwardly and couple said annular clutch disc means together when fluid flows under pressure through said recess into said cylinder, said support plate (109) further including a forwardly extending annular collar (111) surrounding the forward end of said input shaft, and bushing means (115) between said forward end of said input shaft and the inside of said collar.

4,033,437
SYNCHRONIZER WITH ROCKING KEY DISENGAGEMENT

Pierre Labat, Chatillon, France, assignor to Societe Anonyme de Vehicules Industriels et d'Equipements Mecaniques (SAVIEM), France

Filed Mar. 10, 1976, Ser. No. 665,366
Claims priority, application France, Mar. 19, 1975, 75.08618
Int. Cl.² F16D *23/06*
U.S. Cl. 192—53 F **3 Claims**



1. In a synchronizing and coupling device for a motor vehicle gearbox of the kind including a drive shaft and two pinions for selective coupling to said drive shaft, a set of dog teeth on each pinion, and a conical friction surface on each pinion under said dog teeth, said device comprising a driving collar adapted for driving engagement with said drive shaft, a coupling ring, a plurality of radial bars on said coupling ring, means mounting said coupling ring on said driving collar for rotation therewith and axial movement therealong to engage said bars with said dog teeth of either of said pinions, a double synchronizer ring, a pair of conical friction surfaces on said double synchronizer ring, means mounting said double synchronizer ring for movement by said coupling ring selectively to engage one of said friction surfaces on said synchronizer ring with the friction surface of one of said pinions, locking surfaces on said synchronizer ring and on said bars of said coupling ring co-operable to prevent further axial movement of said coupling ring to engage said bars with said dog teeth on said pinion until the speeds of said coupling ring and said pinions are synchronized, the improvement wherein said device further comprises a plurality of rocking keys bracing said double synchronizer ring, means defining a plurality of axial grooves in said driving collar, each of said grooves receiving and locating one of said rocking keys, a plurality of radial thrusters in said grooves and on which said rocking keys are adapted to rock, radially inner and outer faces of each of said rocking keys, first notch means near the middle of said outer face of each rocking key, sloping sides to said first notch for co-operation with said coupling ring, second notch means near the middle of said inner face of each rocking key, and sloping sides to said second notch for co-operation with said thruster whereby when said coupling is moved to uncouple it from one of said pinions said rocking keys move to re-center said second notches on said thrusters and thereby disengage

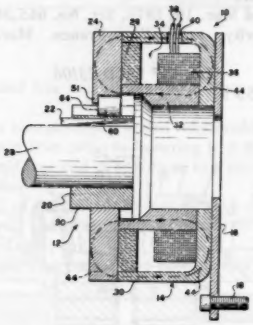
said friction surfaces. of said synchronizer ring and said pinions.

4,033,438

ROLLER SPLINE

Howard E. Wiltsey, Racine, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 26, 1976, Ser. No. 662,051
Int. Cl.² F16D 27/10, 3/64; F16B 3/00
U.S. Cl. 192—84 A 5 Claims



1. An electromagnetic coupling comprising an armature plate, a hub member disposed substantially concentric to said armature plate for supporting said armature plate for rotation therewith, a pole assembly, said pole assembly and armature plate having an engaged position establishing a driving relationship therebetween and a disengaged position, a coil energizable to effect engagement of said pole assembly and armature plate, roller coupling means for coupling said armature plate and hub member and compensating for misalignment therebetween,

said hub member including an outer surface having a plurality of first arcuate recesses disposed therein,

said armature plate including an inner surface having a plurality of second arcuate recesses disposed therein,

said plurality of first and second arcuate recesses forming a plurality of sets of first and second complementary recesses, each of said plurality of sets of complementary recesses defining a substantially cylindrical opening between said outer surface of said hub and said inner surface of said armature plate, and

said roller coupling means including a plurality of rotatable cylindrical pins, one of which is disposed in each of said cylindrical openings for coupling said armature plate and hub member together,

said cylindrical pins having a diameter less than the diameter of said cylindrical openings to establish a diametric clearance between said cylindrical pins and said cylindrical openings which allows relative axial movement between said armature plate and hub member in a direction parallel to the axis of rotation of said armature plate and hub member and which compensates for misalignment therebetween,

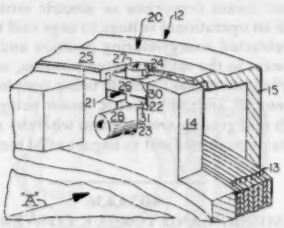
said cylindrical pins being deformable to enable said cylindrical pins to conform to the shape of said substantially cylindrical openings while compensating for misalignment of said armature plate and hub member.

4,033,439

REMOVABLE SPLINE BETWEEN CLUTCH PISTON AND CYLINDER

Robert P. Nichting, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 2, 1976, Ser. No. 673,242
Int. Cl.² F16D 25/00
U.S. Cl. 192—85 AA 4 Claims



1. In a rotating clutch a vehicle having positioned between a movable clutch piston and a base element, the improvement comprising:

said clutch piston having an axis and at least one slot on the outer periphery, said slot having first said second portions adjacent an opening through the base element; and

means for connecting the clutch piston to the base element for rotating one with the other as a unit and movement of the clutch piston in directions toward and from the base element and intervening clutch disc, said means comprising:

a guiding block positioned within the first portion of the clutch piston slot, said clutch piston being slidably movable along the axis and relative to the block;

a locking pin extending from the guiding block through the opening of the base element; and

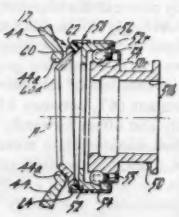
a retaining pin positioned in the second portion of the clutch piston slot, said retaining pin being of size sufficient for removably maintaining the locking pin in the base element opening.

4,033,440

SELF-ALIGNING CLUTCH BEARING ASSEMBLY

Eli M. Ladin, Ann Arbor, Mich., assignor to Federal-Mogul Corporation, Southfield, Mich.

Division of Ser. No. 427,486, Dec. 26, 1973, Pat. No. 3,931,875. This application July 7, 1975, Ser. No. 593,627
Int. Cl.² F16D 23/14
U.S. Cl. 192—98 3 Claims



1. In a bearing assembly having inner and outer race means and a plurality of anti-friction bearing elements constrained between said inner and outer race means, the invention wherein an annular wear plate having inner and outer peripheries is disposed substantially perpendicular and concentric to the axis of the bearing assembly and has one of its peripheries supported from said outer race means by a resilient annular

element so as to permit limited deflection of said wear plate in a direction perpendicular to the axis of said bearing assembly and in directions angularly tilted with respect to the axis of said bearing assembly relative to said outer race means and thereby providing said bearing assembly with a self-aligning capability, said resilient annular element having inner and outer peripheries, one of said peripheries of said resilient annular element being affixed to said outer race means and the other periphery of said resilient annular element being affixed to one of the peripheries of said annular wear plate, the inner and outer peripheries of said resilient annular element being offset both radially and axially relative to each other with the bulk of said resilient annular element being disposed there between, said annular wear plate having an annular conical flange extending around the other periphery thereof.

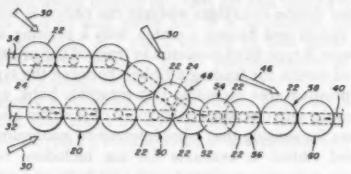
4,033,441
MERGING OR BLENDING TECHNIQUES FOR SMALL PARTS

William V. Pataki, Ephrata, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 587,170, June 16, 1975, abandoned. This application Sept. 30, 1976, Ser. No. 728,271

Int. Cl.² B65G *11/00*

U.S. Cl. 193—38 **3 Claims**



1. A method of combining two merging streams of parts having heads and shanks, comprising:

progressing the stream of parts in different vertical planes with the parts in each stream having their shanks vertically oriented and their heads aligned, and with both streams of parts progressing generally in the same direction;

leading the steams of the progressing parts at different levels such that at least a portion of the shank of the parts in the upper stream lies in the same plane as the heads of the parts in the lower stream in overlapping relationship; and

while maintaining the overlapping relationship, progressively merging the streams at the last part of the progression in the horizontal direction to bring the parts in the merged stream into the same vertical plane;

whereby the shanks of the parts in the upper stream become interposed between the heads of the parts in the lower stream as the streams are merged into a single stream without stoppage.

4,033,442
LOCKING AND RELEASING MECHANISM FOR A VENDING MACHINE

Arthur N. Wirstlin, Altoona, and Henry J. Albright, West Des Moines, both of Iowa, assignors to Fawn Engineering Co., Des Moines, Iowa

Filed Apr. 30, 1976, Ser. No. 681,913

Int. Cl.² G07F *5/02*

U.S. Cl. 194—17 **10 Claims**

1. A mechanism for selectively locking and releasing an actuating means for an item vending machine comprising:

a frame having an abutment surface thereon;

actuating means connected to said frame for releasing an item from said vending machine upon movement of said actuating means from a first position to a second position;

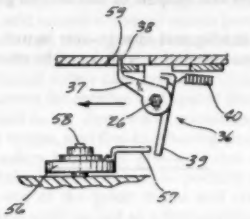
a plate member movably attached to said frame;

means for operatively linking said plate member to said actuating means whereby movement of the actuating means causes movement of the plate member;

a shaft connected to said plate member;

arm means connected to said shaft and having a first pivotal position wherein one end of said arm means is in juxtaposition with a portion of said plate member on one side of said one end, and in juxtaposition to said abutment surface on the other side of said one end thereof whereby said actuating means is locked from substantial movement, said arm means having a second pivotal position spaced from said abutment surface for unlocking said actuation means;

biasing means for biasing said arm means to said first pivotal locking position;



coin registering means attached to said frame for registering the amount of money deposited in the mechanism, said coin registering means having a projection means thereon, said projection means moving to specific locations upon deposit of specific amounts of money deposited in the mechanism, said projection means being spaced from said arm means in one position thereof for maintaining said actuating means in a locking position and being adjacent to said arm means in a second position thereof for unlocking said actuating means by allowing movement of the actuating means to move the arm means against said projection means, thereby pivoting said arm means to said second position thereof away from said abutment surface.

4,033,443
LOGIC CIRCUIT FOR GREY-TONE PRINTER

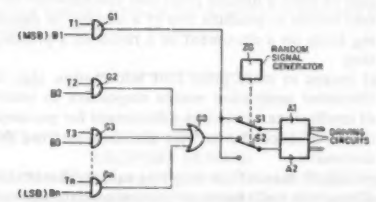
Ernst Bunge, Hamburg; Ulf Rothgordt, Norderstedt; Bernd Ehlers, Tornesch, and Herbert Piotrowski, Kaltenkirchen, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed July 17, 1975, Ser. No. 596,955

Claims priority, application Germany, July 22, 1974, 2435090

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **2 Claims**



1. A logic circuit for a grey-tone image printer, comprising a clock pattern generator having a plurality of outputs, each of said outputs producing a distinct clock pulse pattern with a different predetermined number of clock pulses within a predetemined time interval;

input means for supplying a digital representation of the density value of an image to be printed;

a first and second group of AND-gates, each of said groups comprising at least one AND-gate, each of said AND-

gates having a first input to a corresponding bit of said digital representation, a second input connected to a corresponding output of said clock pattern generator, and an output;

an OR-gate, having a plurality of inputs connected to said outputs of said first group of said AND-gates, and an output;

first and second driving circuits for printing a dot pair, having first and second inputs respectively for activation of the corresponding driving circuits, said first driving circuit for printing the first dot, and said second driving circuit for printing the second dot of said dot pair;

a change-over switch, connecting said first and second inputs of said driving circuits with said output of said OR-gate, and said outputs of said second group of AND-gates; and

means for switching said change-over switch comprising a random signal generator with a synchronized output.

4,033,444

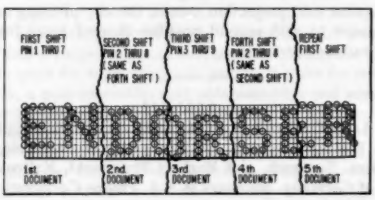
SYSTEM FOR EXTENDING THE LIFE OF A PIN PRINTER USING PIN SHIFTING

Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Jan. 20, 1976, Ser. No. 650,723

Int. Cl.² B41J *3/04*

U.S. Cl. 197—1 R **10 Claims**


FIRST SHIFT PIN 1 THRO 7
SECOND SHIFT PIN 2 THRU 8 (SAME AS FORTH SHIFT)
THIRD SHIFT PIN 3 THRU 9
FORTH SHIFT PIN 2 THRU 8 (SAME AS SECOND SHIFT)
REPEAT FIRST SHIFT
ENDORSER
1st DOCUMENT
2nd DOCUMENT
3rd DOCUMENT
4th DOCUMENT
5th DOCUMENT

1. Apparatus for shifting the operation of the pins or styli of a matrix pin printer so as to minimize the wear of the most used pin combination comprising,

a matrix of individual styli capable of movement from a non-print to a print position and return on command,

means to store a desired print font combination for causing said matrix to produce one of a number of desired printing fonts on a document as a result of a printing operation,

said means to store print font information also including character generation means responsive to interrogation of intelligence carried by a document for producing characters in accordance with the data derived from said document,

logic circuit means for energizing said stylii matrix in accordance with said character generation data and said stored print font information to cause said matrix to print on said document the desired character font in a given character font orientation and size, and

means for altering the pin selection combination of the matrix while maintaining the same given character font orientation and size whereby the specific set of stylii for each actuation of the matrix is shifted so as to distribute the utilization of the various pins of the matrix in accordance with a prescribed, prearranged pin selection pattern.

4,033,445

RIBBON FEED DEVICE FOR OFFICE MACHINES

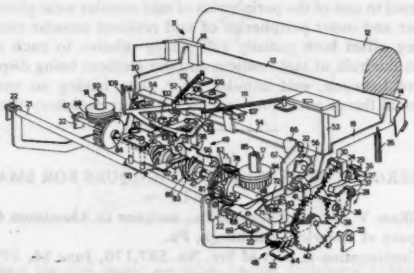
Giuseppe Oddicini, Banchette (Turin), Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Apr. 22, 1975, Ser. No. 570,528

Claims priority, application Italy, Apr. 24, 1974, 68293/74

Int. Cl.² B41J *33/14*

U.S. Cl. 197—151 **14 Claims**



2. A carbon coated ribbon cartridge removably mountable in a typewriter of the type which utilizes both ink and carbon coated ribbon cartridges wherein the ribbon is wound around two spools and having a platen with a printing area defined thereon, a type head mounted in front of the printing area and a feed device for feeding a ribbon between the type head and the printing area including two rotatable hubs, each one engageable with one associated spool of said two spools, sensing means for sensing that a predetermined minimum quantity of wound ribbon is available for use including two pivotally mounted levers associated with said hubs and each having a projection at the end portion thereof for cooperating with the ribbon wound on the one associated spool, motive means responsive to the position of said levers for driving one or the other of said spools for bidirectionally feeding the ribbon in front of said printing area roller means including a pressure roller and a motive roller engageable with said carbon ribbon for unidirectionally feeding the ribbon from the printing area to one of the hubs, said cartridge comprising:

a case including upper and lower substantially parallel walls and sidewalls;

a take-up spool of said two spools rotatably mounted in said case and engageable with said one hub and around which a carbon coated ribbon is to be taken-up during use;

a feed spool of said two spools rotatably mounted in said case and engageable with the other hub and around which a carbon coated ribbon is wound for feeding by said feed device during use;

means defining two slots in one sidewall of said case which faces the printing area when the cartridge is mounted, one of said slots providing an exit from the case and the other slot providing entry into the case through which a run of ribbon is looped;

means for guiding the ribbon from said other slot to the outside of said take-up spool along a predetermined path;

means defining an access aperture in a portion of said case opposite from said one sidewall configured to receive said pressure roller and said motive roller to permit engagement of the ribbon by said roller means between said guide means and the take-up spool when the cartridge is mounted along said path;

means defining another aperture in the lower wall of said case configured to receive the two projections of the two levers therein during use of the cartridge; and

control means cooperative with one of said levers, when the cartridge is mounted, and avoiding the projection of said one lever to cooperate with the ribbon wound on said corresponding spool for causing said motive means to

rotate said one hub, thereby winding on said take-up spool the ribbon fed thereto by said roller means.

4,033,446

THREE-POSITION RIBBON GUIDE FOR PRINTER

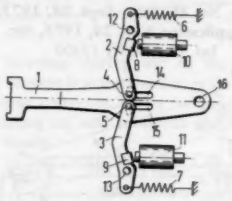
Werner Taubert, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 8, 1976, Ser. No. 664,874

Claims priority, application Germany, Mar. 20, 1975, 2512337

Int. Cl.² B41J *35/10, 35/20*

U.S. Cl. 197—157 **6 Claims**



1.A ribbon guide bar for a printer assembly comprising a pair of armature levers carried pivotally on pins spaced transversely to an axis of said guide bar in a horizontal, center position for movement in a plane formed by said guide bar, each said lever being actuated by an electromagnet in one direction and by a spring in an opposite direction and carrying at an end thereof a coupling pin, the ribbon guide bar being pivoted at one end about an axis parallel to said armature lever pins and carrying a ribbon guide at an opposite end and comprising:

a pair of guide slots formed in said bar between said ends, spaced apart transversely of said guide bar axis, each said slot slidably but snugly receiving one of said coupling pins of said levers and comprising

a first, generally vertical portion having an end spaced adjacent said guide bar axis, and

second horizontal portion extending parallel to said guide bar axis and having an end coinciding with said end of said first slot portion, whereby each coupling pin may travel freely between said first and second guide slot portions,

whereby said guide bar may be locked in any of three positions by said coupling pins in said guide slots depending upon actuation of said electromagnets.

4,033,447

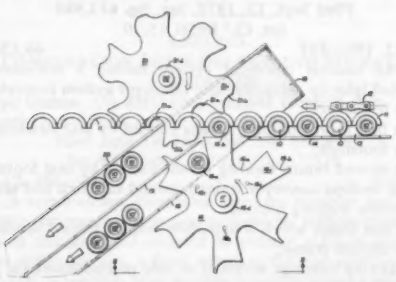
CONTAINER LINE DIVIDER

Robert J. Heier, Whitehouse, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Aug. 11, 1975, Ser. No. 603,410

Int. Cl.² B65G *47/26*

U.S. Cl. 198—441 **5 Claims**



1. Container handling apparatus for transferring containers comprising a first horizontal straight line conveyor movable at a substantially uniform speed in one direction including a side-open pocket chain having the pockets at equally spaced intervals therealong and adapted to carry containers in a straight line, a guide means adjacent the first conveyor and spaced opposite said open side of the pockets for retaining containers in the pockets,

a second horizontal conveyor means at the same elevation as said first conveyor and including a straight section movable across the path of the first conveyor at an obtuse angle, said pocket chain conveyor extending across said second conveyor means, the second conveyor means adapted to be driven in a diverging direction away from the side open pockets and at obtuse angular relationship with said chain conveyor, said guide means terminating adjacent said second conveyor means permitting containers to leave said side open pockets thereafter upon being carried onto said second conveyor means,

a first horizontal rotary cam member carried on a vertical shaft mounted for rotation and spaced from the side open pockets and in the direction of movement of the second conveyor means, said first cam having alternating primary and secondary lobes, the primary lobes engaging alternate containers in the side open pockets as they pass the terminal end of the guide means and retaining them in said pockets until carried to a first position on the second conveyor means by the side open pockets, whereupon rotary movement of the first lobes away from the path of the pocket chain releases the containers for egress from their said pockets for thereafter conveying them in a first line on the second conveyor means, and the secondary lobes of said cam permit alternate containers in said chain pockets to be released therefrom at a second position on the second conveyor means, said second lobes restraining such containers at said second position during cam rotation to release them in a second line spaced from said first line on the second conveyor means,

a second horizontal rotary cam member carried on a vertical shaft mounted for rotation on the opposite side of the pocket chain from said first cam, said second cam having primary and secondary lobes, the primary lobes adapted to engage containers in the chain pockets and guide them to said second position on the second conveyor means and the secondary lobes adapted to receive containers retained in the pockets by the primary lobes of the first cam to guide them to said first position on the second conveyor means,

means connected to the shafts of said first and second cam members for driving them in opposite directions of rotation and in synchronism,

a center guide member, and

means mounting said guide member longitudinally of the second conveyor intermediate the first and second lines of containers formed thereon, the guide means extending from the transfer zone on the second conveyor and in the downstream direction thereon.

4,033,448

CONVEYOR TRANSFER APPARATUS PICKUP AND DROPOFF SENSOR

Thomas R. MacFarlane, and Frank R. Skinner, II, both of St. Joseph, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

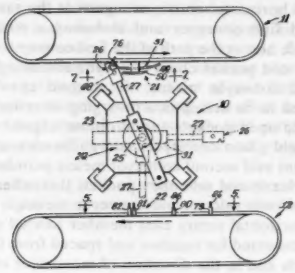
Filed Oct. 24, 1975, Ser. No. 625,519

Int. Cl.² B65G *47/00*

U.S. Cl. 198—465 **11 Claims**

1. In an apparatus for transferring an article from a first moving conveyor to a second moving conveyor, said apparatus having a carrier provided with a pickup device, means for raising the carrier to cause the pickup device to engage the article at a pickup position and pick up the article from the first conveyor, and means for moving the carrier to bring the

picked up article from the pickup position to a dropoff position adjacent the second conveyor whereat the article may be transferred to the second conveyor, the improvement comprising: a control disposed to be actuated by the article reaching a preselected position spaced from said pickup position; means for causing the pickup device to be juxtaposed to the



article as an incident of actuation of said control; sensing means for sensing the juxtaposition of the article to the pickup device at said pickup position; and means responsive to the sensing of said juxtaposition to initiate raising of the carrier to cause said pickup device to pick up the article and prevent operation of the moving means until said article is fully picked up by said pickup device.

4,033,449

APPARATUS FOR HANDLING BULK MATERIALS

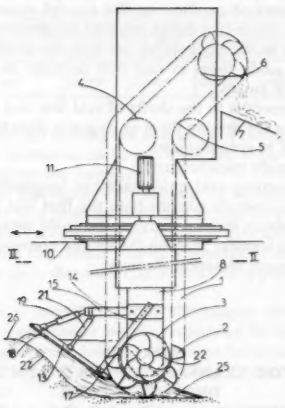
Jacques Pradon, 19 Avenue de la Tourelle, Saint-Maur-des-Fosses, France

Continuation of Ser. No. 242,378, April 10, 1972. This application Jan. 24, 1975, Ser. No. 543,979

Claims priority, application France, Apr. 15, 1971, 71.13234; Mar. 24, 1972, 72.10357

Int. Cl.² B63B *27/00*

U.S. Cl. 198—520 **4 Claims**



1. Bulk handling apparatus for removing material from the sloping face of a pile of material comprising a substantially vertical bucket elevator, a discharge for said bucket elevator, means for removing handled substances at said elevator discharge, a substantially vertical moveable arm supporting said bucket elevator, means for rotating said arm around its vertical axis, means for supporting said moveable arm for horizontal movement of said arm along the face of the pile of material, slat cutting means mounted for articulation around a long axis adjacent the bottom of said arm and means for positioning said slat cutting means substantially parallel to the slope of the face of the pile of material and substantially in a plane extending through the buckets of the elevator, said positioning means holding said slat cutting means in position during use with the upper end of said slat leading the bottom end of said slat during horizontal movement of said arm and of said slat along the face of the pile.

4,033,450

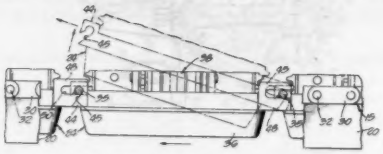
CONVEYOR WITH REMOVABLE RECEPTACLES

Paul F. Paddock, Riverside, and Jerry W. Cramer, Upland, both of Calif., assignors to Sunkist Growers, Inc., Sherman Oaks, Calif.

Division of Ser. No. 401,886, Sept. 28, 1973, Pat. No. 3,945,489. This application Nov. 24, 1975, Ser. No. 634,497

Int. Cl.² B65G *15/00*

U.S. Cl. 198—648 **1 Claim**



1. In a conveyor wherein a row of receptacles are linked together to form a conveyor chain with

transverse rods respectively at the junctures of the receptacles, the improvement in which:

each receptacle is provided with an open longitudinal slot connection means at one of its ends releasably straddling a transverse rod, and

with a laterally open slot connection means at the other of its ends releasably straddling an adjacent transverse rod;

said slot connection means at said ends coacting to normally retain the receptacles connected to the chain, but permitting a receptacle to be removed from the row of receptacles by first disconnecting said other end of the receptacle from its transverse rod by lateral movement of said other end and thereafter disconnecting said one end of the receptacle from its transverse rod;

said conveyor chain being supported for movement in a continuous circuit including an upper run and a lower run;

the laterally open slot connection means comprising a pair of similar entrance slots which are upwardly inclined when the receptacle is on the upper run to retain the receptacle on the transverse rod, and downwardly inclined when the receptacle is on the lower run so as to permit disengagement from the transverse rod.

4,033,451

SELF-COUNTERWEIGHTED TAKE-UP

Frederick A. Kelsall, Milwaukee, Wis., assignor to Rexnord Inc., Milwaukee, Wis.

Filed Sept. 12, 1975, Ser. No. 612,985

Int. Cl.² B65G *15/30*

U.S. Cl. 198—815 **46 Claims**

1. An endless conveyor system having a self-counterweighted take-up assembly, said conveyor system comprising:

a. a headshaft;

b. a first return training means carried by said headshaft;

c. a footshaft;

d. a second return training means carried by said footshaft;

e. an endless conveyor trained around said first and second return training means;

f. a first frame which is immobile relative to said headshaft;

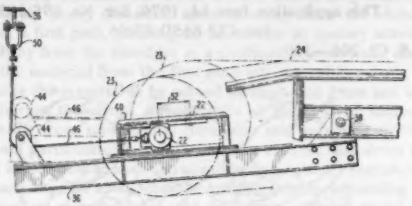
g. a second frame;

h. take-up bearings mounted on said second frame for journalling the ends of said footshaft for longitudinal sliding;

i. first means for pivotably mounting said second frame

about an axis parallel to said footshaft and spaced from said footshaft on one side of said take-up bearings; and

j. second means for permitting said second frame to pivot about its axis as the ends of said footshaft move in said



take-up bearings during use of the conveyor system, whereby tension is maintained in said endless conveyor as said endless conveyor varies in length by the force of gravity acting on said footshaft and said second return training means.

4,033,452

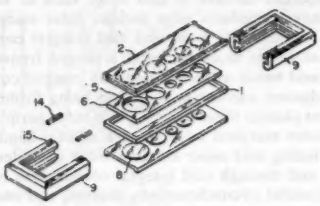
DISPLAY CONTAINER

Norman W. Therrien, Box 1106, Pittsfield, Mass. 01201

Continuation of Ser. No. 392,897, Aug. 30, 1973, Pat. No. 3,957,157. This application May 14, 1976, Ser. No. 686,440

Int. Cl.[5] A45C *11/28*

U.S. Cl. 206—.83 **5 Claims**



1. A container comprising first and second air-impermeable retaining plates each having two main faces and arranged with one main face of the first plate confronting one main face of the second plate, at least one recess in said one main face of said first plate, and a resilient, air-impermeable sealing member positioned between the retaining plates continuously about the recess, the two retaining plates being fitted in a frame defining a channel-section recess which extends about the periphery of the retaining plates and in which edge portions of the retaining plates are received to compress the retaining plates against the sealing member thereby to form air-tight seals between the sealing member and the retaining plates respectively, the frame including at least two frame members both of which are readily removable to permit disassembly of the container and are readily replaceable to facilitate reassembly of the container.

4,033,453

COMBINATION DRINKING CUP AND STORAGE CONTAINER

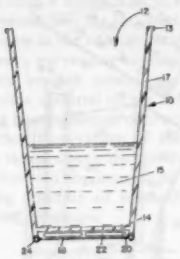
Joseph Glaimo, c/o JMC Tool Co., 845 Fairfield Ave., Kenilworth, N.J. 07033

Filed June 18, 1976, Ser. No. 697,424

Int. Cl.[2] B65D *77/04, 77/28, 77/36*

U.S. Cl. 206—217 **8 Claims**

1. A combination disposable drinking tumbler and commestible storage container comprising a walled receptacle open at one end and adapted to receive a liquid and said commestible therein, a floor adjacent the end opposite said open end, a tearable base portion coaxially aligned with said floor, spaced apart therefrom and forming the opposite end of said receptacle, said base portion being in planar alignment with the lower end of said wall, a removeable rib removeably affixed between said base and said wall, a quantity of liquid



soluble commestible disposed in the space formed beween said floor and said base, the removal of said rib causing the tearing of said tearable base portion and the subsequent release of said commestible.

4,033,454

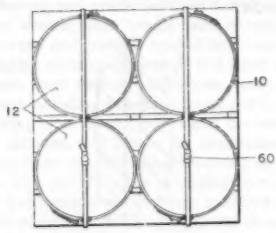
METHOD AND STRUCTURE FOR RETAINING SHIPPING DRUMS ON PALLETS

Cesar Santoni, Hamilton, Canada, assignor to Greif Bros. Corporation, Delaware, Ohio

Filed July 6, 1976, Ser. No. 702,458

Int. Cl.[2] B65D *19/00*

U.S. Cl. 206—386 **31 Claims**



1. A large drum adapted to be mounted on a pallet comprising; a tubular body having a bottom closure sealing the bottom end of the tubular body and a top closure sealing the top end of the tubular body, the drum adapted to be positioned on the pallet for engagement by at least one strap coupling the drum to the pallet, and confining means on the drum adapted to receive and retain the at least one strap from slipping off the drum used to fasten the drum to the pallet.

4,033,455

CONTAINER

Charles D. Robison, 4309 Estes Road, Nashville, Tenn. 37215

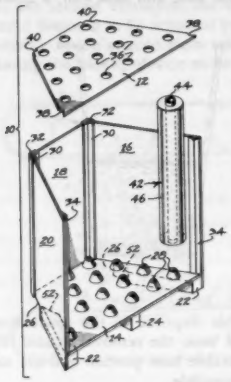
Filed Sept. 27, 1976, Ser. No. 726,846

Int. Cl.[2] B65D *85/66, 19/00, 21/04*

U.S. Cl. 206—391 **5 Claims**

1. A film transporter comprising a container having three

sides and at least one upright end having a plurality of openings therein adapted for extension therethrough of ends of



cores of rolls of sheet and wherein 2 sides of the container extend from the third at oblique angles.

4,033,456

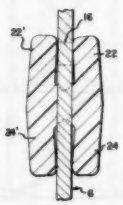
TERMINAL STRIP HAVING PLASTIC CARRIER STRIP

Donald Andrew Wion, Harrisburg, and Christopher Kingsley Brown, Camp Hill, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 25, 1976, Ser. No. 689,883

Int. Cl.² B65D *73/02, 85/42, 85/24*

U.S. Cl. 206—347 **4 Claims**



1. A continuous strip of terminal posts, said posts being intended for insertion into a printed circuit board by an insertion apparatus of the type having an insertion punch which engages one end of each pin and pushes it axially into the printed circuit board, said strip comprising:

a continuous carrier strip of thermoplastic material, said strip having a web portion and a pair of continuous post holding flanges extending from the edges of said web portion on both sides of said web portion,

a plurality of terminal posts extending through and held in said web, the axes of said posts extending substantially normally of said web,

portions of said posts which are between said flanges on both sides of said web portion being confined against lateral movement by said flanges whereby said posts are stabilized in a common plane, said posts being individually removable from said strip during insertion into a printed circuit board by axially aligning the leading post of said strip with an insertion punch and thereafter moving said punch towards said leading post whereby said punch will push said leading post from said strip and into said printed circuit board located beneath said strip.

4,033,457

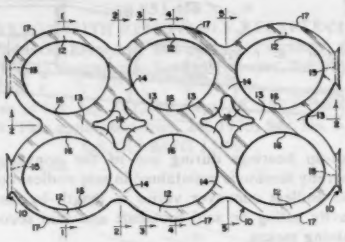
REEL-WINDABLE CONTAINER CARRIER STOCK

William Norfred Weaver, Glen Ellyn, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation of Ser. No. 541,742, Jan. 17, 1975, abandoned. This application June 14, 1976, Ser. No. 695,665

Int. Cl.² B65D *85/66*

U.S. Cl. 206—390 **3 Claims**



1. A roll of container carrier stock wound in superposed layers and having a central annular circumferential hump, said stock comprising a strip of multiple container carriers connected in series in an end-to-end relationship, each of the multiple container carriers in said strip comprising a plurality of pairs of container encircling bands and integral webs interconnecting the bands of each pair of bands and the adjacent pairs of bands in said carrier, integral connections between the ends of adjacent carriers in said strip, each of said bands having a inner peripheral edge and an outer marginal edge extending between said webs and said integral connections, said pairs of bands in each carrier arranged transversely of said strip, said bands and webs and said integral connections between adjacent carriers in said strip being formed from a thin resilient plastics sheet material, said inner peripheral edge and said outer marginal edge of each of said bands in each carrier including said outer marginal edge extended through said webs and through said integral connections being substantially parallel circumferentially thereof, and each of said carriers including radially outward curvilinear tabs integrally extending from the outer marginal edges of the portions of each two adjacent bands in each carrier which are circumferentially between the webs interconnecting the bands of each pair of bands and the webs interconnecting said adjacent bands to substantially increase the mass of said plastics sheet material on each side of the longitudinal center line of said strip and to form said central annular circumferential hump.

4,033,458

METHOD AND APPARATUS FOR CLEANING SHREDDED SCRAP

Julius L. Chazen, 936 Mountain Creek Road, Chattanooga, Tenn. 37405, and James Donald Brock, 524 Northcrest, Chattanooga, Tenn. 37404

Filed Mar. 19, 1975, Ser. No. 560,017

Int. Cl.² B03B ; B07B

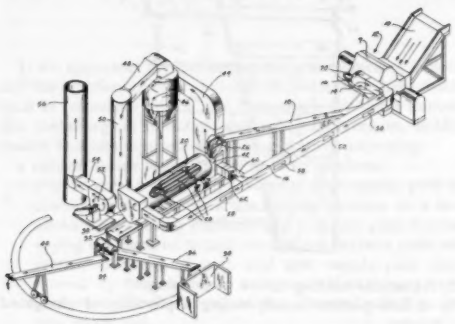
U.S. Cl. 209—11 **8 Claims**

1. A method of cleaning shredded scrap from a heat-generating shredder for metal articles comprising conveying relatively heavy shredded material away from the shredder along a first path, utilizing an air stream to convey scavenge air away from the shredder in a confined second path, directing the material from the first path into a tumbling drum and causing the material to be moved through said drum and to be discharged therefrom, directing the air stream with said scavenge air from said second path into said tumbling drum to entrain particulate material which has entered said drum with said heavy shredded material, directing said air stream with the scavenge air away from the tumbling drum, separating said particulate material from said air stream, bypassing a portion of said air stream from said second path around said tumbling

drum to vary the velocity of air flow though said drum, and then merging said bypassed air stream with the air stream leaving said tumbling drum.

3. A method of cleaning shredded scrap from a heat-generating shredder for metal articles comprising conveying relatively heavy shredded material away from the shredder along a first path, utilizing an air stream to convey scavenge air away from the shredder in a confined second path, directing the material from the first path into a tumbling drum and causing the material to be moved through said drum and to be discharged therefrom, directing the air stream with said scavenge air from said second path into said tumbling drum to entrain particulate material which has entered said drum with said heavy shredded material, directing said air stream with the scavenge air away from the tumbling drum, separating said particulate material from said air stream, utilizing metal duct work to confine the air stream in said second path, and raising the temperature of the air stream sufficiently to cause heating of the duct work above the dewpoint to thereby prevent condensation of moisture and build-up of particulate matter on the interior of said duct work.

6. Apparatus for cleaning shredded scrap from a heat-generating shredder for metal articles comprising a tumbling drum, means for conveying relatively heavy shredded material from said shredder to said tumbling drum, said drum having means for causing the heavy material to be moved through said drum as it is being tumbled therein and to be discharged



from the opposite end thereof, conduit means connected between said drum and the outlet of said shredder for receiving an air stream with scavenge air from said shredded scrap and for conveying it to said tumbling drum, means for causing movement of said air stream through said shredder, and through said conduit means and drum to remove particulate material from the tumbling scrap in the drum, means for directing said air stream with particulate material therein away from said tumbling drum, means for separating said particulate material from said air stream, bypass means for bypassing a portion of said air stream from said conduit means around said tumbling drum to control the velocity of air flow through said drum and thus to control the size of the particulate material removed from said shredded scrap in said tumbling drum.

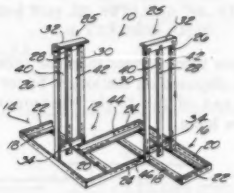
8. Apparatus for cleaning shredded scrap from a heat-generating shredder for metal articles comprising a tumbling drum, means for conveying relatively heavy shredded material from said shredder to said tumbling drum, said drum having means for causing the heavy material to be moved through said drum as it is being tumbled therein and to be discharged from the opposite end thereof, conduit means connected between said drum and the outlet of said shredder in such a location as to receive a heated air stream with scavenge air from said shredded scrap and convey it to said tumbling drum to provide the air supply therefor, means for causing movement of said air stream through said shredder, and through said conduit means and drum to remove particulate material from the tumbling scrap in the drum, means for directing said air stream with particulate material therein away from said tumbling drum, means for separating said particulate material from said air stream, the connection of the conduit with the shredder being in such a location as to receive an air stream heated by heat generated by the shredder to cause the temperature of the air stream in the conduit means to be raised above the dewpoint, thereby preventing condensation of moisture on the interior of said conduit means, and thereby preventing buildup of particulate material on the interior of said conduit means, there being heating means connected with said conduit means whereby the temperature of the air stream in said conduit means is raised above the dewpoint to prevent condensation of moisture on the interior of said conduit means, thereby preventing build-up of particulate material on the interior of said conduit means.

4,033,459

MODULAR BICYCLE RACK

Donald J. Zach, 5824 Glen Flora Drive, Greendale, Wis. 53129

Filed Sept. 29, 1975, Ser. No. 617,461
Int. Cl.² B62H *3/00*
U.S. Cl. 211—20 **1 Claim**



1. A modular stand for bicycles each modular unit comprising a base having two cradle sections for receiving and supporting bike wheels, each cradle section including parallel spaced side runs and parallel spaced end runs which define ground engaging rectangular frames and sized to support two bicycle wheels from opposed directions, vertically extending frame portions including a dividing frame portion defining two wheel receiving slots connected to and centered on each of said cradle sections, and means for connecting and spacing said cradle sections and said wheel receiving slots in staggered relationship with the vertically extending frame portions oriented along fixed spaced parallel axes to afford storage of two bikes in each of said cradles from opposite directions without handlebar interference and wherein said connecting means for connecting said cradles comprise extensions on one of the end runs of each cradle which extend beyond said cradle side runs with the end runs having the extensions being connected to the side runs of the adjacent cradle adjacent the vertically extending frame portions.

4,033,460

HOLDER FOR SKIS, SKI POLES AND SKI BOOTS

Arthur E. Alexandre, 26292 Papagayo, Mission Viejo, Calif. 92675

Filed Mar. 22, 1976, Ser. No. 669,142
Int. Cl.² A47F *7/00*
U.S. Cl. 211—60 SK **9 Claims**

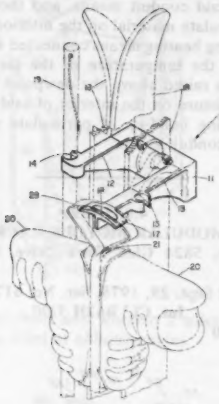
1. A wall bracket for supporting a pair of skis, ski poles and ski boots mounted to a ski boot carrier off the floor, comprising:

wall means disposed at the rear of the bracket;

a pair of fingers secured to the wall means and projecting forwardly therefrom at least the width of a ski and laterally spaced at least twice the thickness measured from the top of the ski to the underside of the ski for vertically

supporting a pair of skis via the front ski boot binding positioned thereon;

ski pole gripping and holding means secured to each of the outside and sidewardly facing portions of the pair of fingers for releaseably gripping and holding a ski pole in vertical disposition; and



one of the fingers being longer than the other finger and having means disposed on the longer finger adjacent the forwardmost end of the finger whereupon a ski boot carrier may be hung.

4,033,461

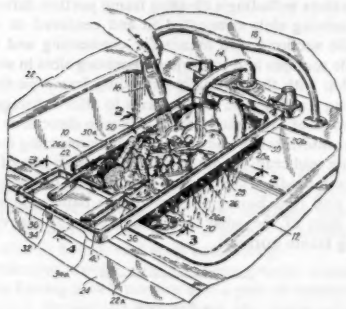
CLEANING AND DRAINING DEVICE FOR SINK

Bela B. Nevai, Dobbs Ferry, N.Y., assignor to Belaco International Ltd., Dobbs Ferry, N.Y.

Filed Feb. 5, 1976, Ser. No. 655,416

Int. Cl.² A47J 19/00

U.S. Cl. 211—86 **22 Claims**



1. A cleaning and draining device for a sink comprising a generally rectangular basket having a bottom, side and end walls, and an open top end; at least one of said walls being foraminous to permit water drainage therethrough; support portions extending outwardly from opposite sides of said basket adapted to rest on and be slidably supported on opposite upper edges of a sink, at least one of said support portions being generally planar to form a tray adapted to support cleaning tools, soap and the like, said tray being arranged in a generally horizontal plane when said support portions rest on the edges of the sink, and said tray including a recessed bottom wall provided with an upwardly projecting surface extending about the periphery of said bottom wall to permit drainage of water accumulated on said tray only into said basket.

4,033,462

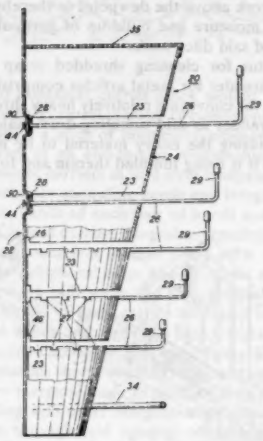
ARTICLE SUPPORT/DISPLAY DEVICE

Diana C. De Fabritis, Aunt Hack Road, Danbury, Conn. 06810

Filed Apr. 30, 1976, Ser. No. 681,795

Int. Cl.² A47F 5/08

U.S. Cl. 211—94 **14 Claims**



1. An article holding device comprising:

A. a first portion incorporating a plurality of elongated tracks;

B. a second portion incorporating

a. a front surface in juxtaposed spaced relationship to said first portion and slanted with respect thereto with the lower edge of the front surface closer to said first portion than the upper edge of the front surface, and

b. a plurality of hook support zones formed in the front surface in juxtaposed spaced relationship to said elongated track;

C. a plurality of anchoring members slidably engaged engaged within the elongated tracks of the first portion; and

D. a plurality of sets of hook members

a. individually secured at one end thereto to one of said anchoring members and extending therefrom to a forward holding position with a portion thereof engaging said support zone of said second portion,

b. each member of a set having a substantially equal length, and at least two of said sets having different lengths, and

c. each set of hook members being engaged in one of said tracks with the shortest length set engaged in the track wherein the distance between the second portion and the first portion is the smallest, and the longest length set engaged in the track wherein the distance between the second portion and the first portion is the largest;

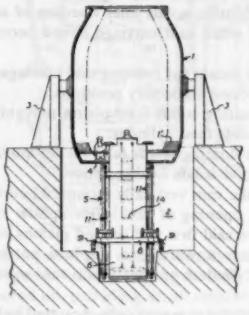
whereby said hook members can be positioned at any location along the track for variable engagement in a plurality of different positions along said hook support zone thereby enabling articles depending from one set of hook members to be positionable thereon without interfering with any other set of hook members.

4,033,463

WORK-FACILITATING APPARATUS FOR LINING CONVERTERS, METALLURGICAL FURNACES, HOLDING VESSELS AND LIKE EQUIPMENT

Gunnar Cervin, Malmo, Sweden, assignor to Cervinter AB, Malmo, Sweden

Filed Feb. 17, 1976, Ser. No. 658,667
Claims priority, application Sweden, Feb. 17, 1975, 7501704; Apr. 7, 1975, 7503930; Sept. 12, 1975, 7510234
Int. Cl.² B66B 9/20
U.S. Cl. 214—1 H 23 Claims



1. An apparatus for facilitating the conveyance of material and the erection of walls of closed circumference from bricks, such as refractory bricks, and particularly for lining converters, metallurgical furnaces, such as blast-furnaces, holding vessels and like equipment, said apparatus comprising:

a vertical frame supporting a working platform;

conveyer means including a vertical conveyance path for conveying material to a discharging position at a level above said working platform and a supply path for conveying the material to said vertical conveyance path, said vertical conveyance path and said supply path being formed by two conveyer runs, one of said runs being extendable by shortening of the other of said runs and vice versa; and

substantially horizontal conveying means, supported by and surrounding said frame, for receiving material delivered to said discharging position by the said conveyer run forming said vertical conveyance path and for transferring the thus received material in a substantially circular path and then to a selected construction position.

4,033,464

CLIP FOR REFLECTIVE INSULATION

Richard Wallace Carr, Lancaster, Ohio, assignor to Diamond Power Specialty Corporation, Lancaster, Ohio

Filed Dec. 8, 1975, Ser. No. 638,788
Int. Cl.² B65G 1/14
U.S. Cl. 214—10.5 R 6 Claims

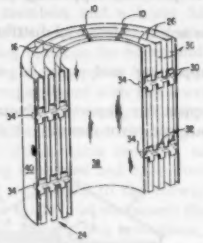
1. A clip for spacedly supporting a series of flanged sheets of reflective insulation comprising:

a series of flanged sheets of reflective insulation;

an elongated strip section mountable transverse to the flanged sections of the series of sheets of reflective insulation;

spacer means formed along one edge of said elongated strip section extending substantially perpendicularly to the plane of said elongated strip section for maintaining a space between each of the series of sheets of reflective insulation; and

retention member means formed along the opposite edge of said elongated strip section extending perpedicularly to said elongated strip section and perpendicularly to said spacer means in a first position and being bendable over the flanged section of each of the flanged sheets of reflective insulation in a second position to capture said flanged sheets to said clip.

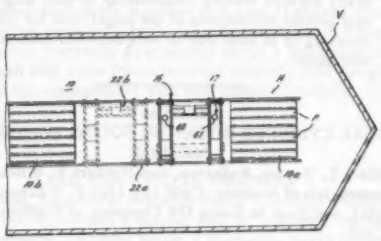


4,033,465

PIPE HANDLING SYSTEM FOR VESSELS

Joe C. Stine, Houston, Tex., assignor to Houston Systems, Inc.

Filed May 20, 1974, Ser. No. 471,215
Int. Cl.² B63B 35/30
U.S. Cl. 214—13 8 Claims



1. A pipe transfer system for transferring pipe from the hold of a vessel to the deck of said vessel and into position for attachment with an underwater pipeline, comprising:

a pipe laying station positioned on the deck of said vessel for laying an underwater pipeline;

overhead crane means mounted in said vessel hold for moving a pipe length from storage in said vessel hold to a position of alignment with a deck hatch;

elevator means for receiving said pipe length from said overhead crane means and for moving said pipe length upwardly from said vessel hold to said vessel deck;

first conveyor means mounted on said deck for receiving said pipe length from said elevator means and for moving said pipe length longitudinally of said vessel; and

second conveyor means for receiving said pipe length from said first conveyor means and for moving said pipe transversely of said ship to said pipe laying station.

4,033,466

GRAIN DRYING AND STORAGE APPARATUS

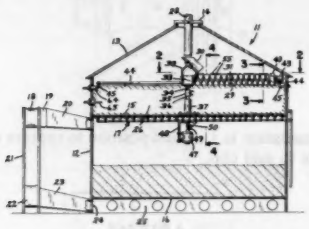
Harlan J. Easton, Box 607 - Rte. 3, Blooming Prairie, Minn. 55917

Filed July 12, 1976, Ser. No. 704,126
Int. Cl.² B65G 65/32
U.S. Cl. 214—17 CB 8 Claims

1. Apparatus for distributing granular material to a given depth over a surface of predetermined size, comprising:

a. an elongated distributing auger having first and second ends, the first end being disposed at the approximate center of said surface;

b. feeding means for delivering granular material to said surface adjacent said first end of said auger;
c. pivot means for pivotally supporting said auger at said first end;
d. drive means for impating material distributing rotation to said auger; l
e. means for supporting said auger at said second end thereof;
f. driving mechanism for imparting pivotal movement to said auger about said pivot means;



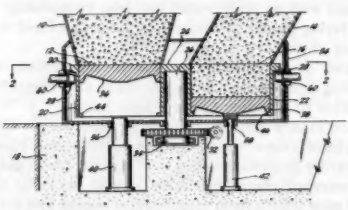
g. an elongated leveller member
h. and support means mounting said leveller member at its opposite ends at said first and said second ends of said auger and disposing said leveller member in spaced generally parallel trailing relationship to said auger during said pivotal movements of the auger, and for raising and lowering of at least one of said opposite ends relative to said auger.

4,033,467

DUAL CYLINDER ROTATING SOLIDS FEEDER AND METHOD

William L. Bewley, Fullerton, and Herbert F. Wilkinson, deceased, late of Anaheim, Calif. (by Alice E. Wilkinson, executrix), assignors to Union Oil Company of California, Brea, Calif.

Filed June 1, 1976, Ser. No. 691,634
Int. Cl.² C10B *31/02*
U.S. Cl. 214—23 **15 Claims**



1. A solids feeder for introducing particulated solids into a solids upflow vessel having a bottom solids inlet opening, which comprises:

a carriage adapted for rotation about a central vertical axis;

a solids feed chute communicating with an elevated solids feed reservoir for transporting particulated solids from said solids feed reservoir by gravity flow, said solids feed chute terminating in a bottom outlet opening located in the same horizontal plane as the bottom solids inlet opening of said solids upflow vessel, said solids inlet opening of said solids upflow vessel and the bottom outlet opening of said feed chute being equally spaced from the central vertical axis of said rotatable carriage along a horizontal axis intersecting the axis of rotation of said carriage;

carriage support means for rotatably supporting said carriage in a horizontal position below said solids upflow vessel and said solids feed chute;

first and second vertical solids feed cylinders mounted on said carriage in spaced relationship, said cylinders being equally spaced from the central axis of said rotatable carriage along a diameter therof, said first solids feed cylinder being axially aligned with and immediately below the bottom solids inlet opening of said solids upflow vessel and said second cylinder being axially aligned with and immediately below the bottom outlet opening of said solids feed chute when said carriage is in a first stationary position, and said first solids feed cylinder being axially aligned with and immediately below the bottom outlet opening of said solids feed chute and the second solids feed cylinder being axially aligned with and immediately below the bottom solids inlet opening of said solids upflow vessel when said carriage is in a second stationary position;

carriage drive means for rotating said carriage between said first and second stationary positions;

a first free-floating solids feed piston movably mounted in said first solids feed cylinder;

a second free-floating solids feed piston movably mounted in said second solids feed cylinder;

a first hydraulic ram vertically mounted below said bottom solids inlet opening of said solids upflow vessel to alternately move said first and second pistons in their respective cylinders upwardly to displace particulated solids from said cylinders upwardly into said solids upflow vessel;

a second hydraulic ram vertically mounted below said outlet opening of said feed chute to alternately control the movement of said first and second piston in their respective cylinders to fill said cylinders with particulated solids from said solids feed chute;

piston support means for supporting said first and second free-floating pistons at the bottom of a filled solids feed cylinder and at the top of an empty solids feed cylinder;

solids sealing means for sealing said bottom outlet opening of said solids feed chute and the solids inlet opening of said solids upflow vessel when said first and second solids feed cylinders are not axially aligned therewith; and

control means for synchronizing the rotation of said carriage and the movement of said first and said second solids feed pistons.

12. A method for transporting particulated solids from an elevated solids feed reservoir and introducing said solids into a solids upflow vessel having a bottom solids inlet opening, which comprises:

transporting said particulated solids by gravity flow from said solids feed reservoir to a first station located adjacent to the bottom solids inlet opening of said solids upflow vessel;

positioning a first solids feed cylinder fitted with a first free-floating piston and filled with particulated solids directly below said solids inlet opening of said solids upflow vessel and a second solids feed cylinder fitted with a second free-floating piston directly below said first station;

simultaneously moving said first free-floating piston upwardly to displace the solids from said first cylinder upwardly into said solids upflow vessel and moving said second free-floating piston downwardly to fill said second cylinder by gravity flow with particulated solids;

maintaining said first piston at the top of said first cylinder and said second piston at the bottom of said second cylinder while moving each of said cylinders along an arcuate path of 180° so that said first cylinder is positioned directly below said first station and said second cylinder is positioned directly below said solids inlet opening of said solids upflow vessel; and

simultaneously moving said second free-floating piston upwardly to displace the solids from said second cylinder upwardly into said solids upflow vessel and moving said first free-floating piston downwardly to fill said first cylinder by gravity flow with particulated solids.

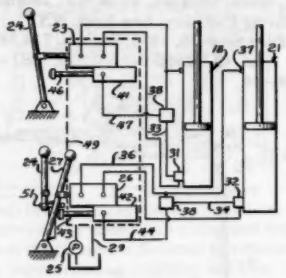
4,033,468
HYDRAULIC BOOM-LIFT SYSTEM WITH SELECTIVE SPEEDS

Wilburn Kelly Brown, Morton Grove, Ill., assignor to Pettibone Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 558,782, March 17, 1975. This application July 7, 1975, Ser. No. 593,374

Int. Cl.² B66C *23/00*

U.S. Cl. 214—130 R **8 Claims**



1. A hydraulic system for raising and lowering a boom at three different speeds, when using a generally constant-speed supply of pressured oil, including an oil reservoir, a first cylinder means, a second cylinder means of different effective cross-sectional area, and valving means including a reversing valve shiftable to reverse and throttle the flow through the connections of supply and return to cylinder means by a single manual actuator, said valving means including means for supplying pressured-oil from said supply as a single source optionally:

a. to the first cylinder means while the second cylinder means is allowed to float, for one speed when not throttled,

b. to the second cylinder means while the first cylinder means is allowed to float, for a second speed when not throttled, or

c. to both cylinder means simultaneously to achieve the maximum lifting force available, and slowest speed when not throttled, by supplying said oil pressure to the combined piston areas of both cylinder means.

4,033,469
FRONT END LOADER AND METHOD OF MOUNTING SAME ON TRACTOR

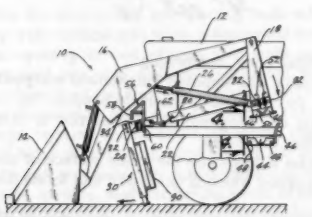
Eldon M. Frank, Lake View, Iowa, assignor to F & W Company, Inc., Lake View, Iowa

Continuation-in-part of Ser. No. 260,465, June 7, 1972, Pat. No. 3,863,786. This application Feb. 3, 1975, Ser. No. 546,432

The portion of the term of this patent subsequent to Feb. 24, 1993, has been disclaimed.

Int. Cl.² E02F *3/72*

U.S. Cl. 214—131 A **18 Claims**



2. A tractor having a quick mount and dismount front end loader comprising,

a front end loader having a U-shaped frame with opposite side frame members extending rearwardly from a forwardly positioned cross frame member having front and back sides, uprights connected to the rear ends of said side frame members and a boom having its rear end connected to the upper end of said uprights, power cylinders extending between the boom and the uprights,

a tractor having side support brackets on opposite sides thereof for engagement with the lower ends of said uprights, a vertically disposed guide support bracket across the front endof said tractor for engagement with the back side of said cross frame member, said guide support bracket being U-shaped and open downwardly,

a stand rigidly connected to the forward end of said U-shaped frame for pivotal movement therewith during the mounting and dismounting operations,

locking means for detachably securing said cross frame member to said forward guide support bracket and said uprights to said side support brackets, said locking means including a pin carried on the U-shaped bracket for engagement with an opening in said cross frame, and the rear leg of said U-shaped bracket tapering downwardly and rearwardly for guiding said cross frame into and out of said U-shaped bracket, and

said power cylinders upon being extended causing said loader to pivot counterclockwise about a pivotal axis through said cross frame member thereby disengaging said uprights from said support brackets when said associated lock means has been opened, and upon said power cylinders being contracted with said cross frame member engaging said guide member and said U-shaped frame extending rearwardly and upwardly said U-shaped frame will pivot clockwise downwardly about a transverse axis through said cross frame member whereby said uprights move into engagement with said support brackets.

4,033,470
SAND AND GRAVEL DREDGES

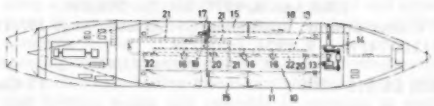
James Venus, Appledore, England; David Charlton, deceased, late of North Shields, England, and by Martha Charlton, administratrix, 1Eleanor Street, Cullercoats, North Shields, Northumberland, NE30 4PG, England

Filed June 13, 1974, Ser. No. 479,129

Claims priority, application United Kingdom, June 13, 1973, 28220/73

Int. Cl.² B65G *53/30*

U.S. Cl. 214—152 **3 Claims**



1. A method of unloading a cargo of dredged sand or gravel or the like from a hold of a ship, said ship having a longitudinally extending duct keel below the floor of the hold, comprising the steps of:

a. pumping a stream of water from tank storage along the duct keel and thence up to deck level;

b. injecting high pressure jets of water into the cargo at a level just above the floor of the hold and oscillating those jets, the jet water pressure being not less than 100 psi, thereby to create a highly turbulent region in which the cargo is decompacted and re-slurried;

c. opening valves to admit decompacted and re-slurried cargo material from this turbulent region into the stream of water flowing along the duct keel;

d. pumping said cargo material from the duct keel up to deck level;

e. de-watering said cargo material at deck level;

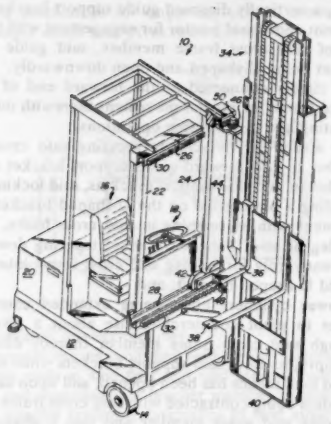
f. discharging the de-watered material outboard.

4,033,471

LIFT TRUCK

D. T. Warner, 10 Waldron Drive, Oadby, Leicestershire, England

Filed June 16, 1976, Ser. No. 696,466
Int. Cl.² B66F 9/20
U.S. Cl. 214—671 4 Claims



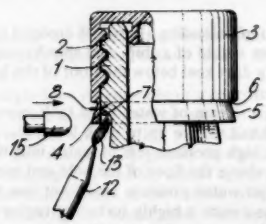
1. A lift truck comprising a truck body supported by wheels, a mast having vertically movable lift arms thereon, said mast being supported on a front end of said body for transverse movement across said front end, upper and lower racks on said body, an upright shaft rotatably supported by said mast, an upper pinion on said shaft in mesh with said upper rack, a lower pinion on said shaft in mesh with said lower rack, said shaft interconnecting said pinions for causing said pinions to rotate through the same degree of rotation, said upper pinion having more teeth than the lower pinion, and said pinions having the same diametral pitch, whereby said post is vertically disposed when on the center line of said truck body and is tilted with respect to the vertical when disposed to one side of said truck body center line.

4,033,472

CLOSURE FOR CONTAINERS

Dietmar Aichinger, Arlesheim, Switzerland, assignor to Albert Gbrist AG, Reinach, Switzerland

Filed Apr. 8, 1975, Ser. No. 566,096
Claims priority, application Switzerland, Aug. 19, 1974, 11218/74; Nov. 9, 1974, 15217/74
Int. Cl.² B65D 41/34, 41/40
U.S. Cl. 215—256 17 Claims



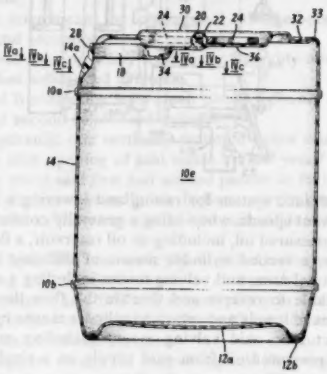
1. A closure for containers consisting of a cap having a downwardly depending band at least partially severable therefrom along a substantially annular predetermined tear line, at least the depending band being of heat deformable thermoplastic material, the depending band increasing in thickness downwardly from the predetermined tear line, the depending band after positioning of the cap on a container being heat deformable into shape-locking engagement with the container, said band as it increases in thickness being devoid of abrupt changes in the contour of its walls such as would preclude axial removal of the cap and band from a nonexpanding mold engaging the band during formation in a molding process.

4,033,473

MOLDED PLASTIC CONTAINER

Paul H. Raley; George H. Dunbeker, both of Hightstown, and Eugene E. Stark, Milltown, all of N.J., assignors to Rheem Manufacturing Company, New York, N.Y.

Filed Sept. 20, 1976, Ser. No. 724,982
Int. Cl.² B65D 7/42, 25/28, 7/02
U.S. Cl. 220—66 14 Claims



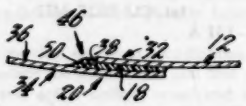
1. A container having a hollow integrally structured body comprising a base, a sidewall extending upright from said base and a top closure having a surface expanse with an access port extending therethrough, said sidewall having a portion contiguous with said access port and extending downwardly and outwardly with progressively decreasing thickness for defining an interior surface extending from said access port continuously arcuately to the expanse of said sidewall adjacent said sidewall portion.

4,033,474

TUBULAR BODY WITH A LAP SIDE SEAM

Kenneth Richard Rentmeester, Barrington, Ill., assignor to American Can Company, Greenwich, Conn.

Division of Ser. No. 75,530, Sept. 25, 1970, Pat. No. 3,760,750. This application Mar. 28, 1973, Ser. No. 345,548
Int. Cl.² B65D 1/16
U.S. Cl. 220—75 1 Claim



1. A tubular body, comprising:

a body blank with opposed longitudinal marginal edge portions forming an adhesively-bonded lap side seam wherein one longitudinal edge portion is uncreased and the other is creased;

a side seam adhesive on the inside surface of said marginal edge portion which is uncreased and forms the outer lap; and

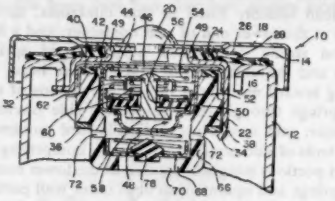
an outwardly extending crease on the other of said marginal edge portions which forms the inner lap and which points angularly in a single direction toward the outer lap, said crease being imbedded in the side seam adhesive on the outer lap such that a raw metal edge on the creased inner lap is buried in and contacts only the side seam adhesive.

4,033,475

ROLL-OVER GAS CAP

John H. Evans, Connersville, Ind., assignor to Stant Manufacturing Company, Inc., Connersville, Ind.

Filed June 9, 1975, Ser. No. 584,763
Int. Cl.² B65D 51/16
U.S. Cl. 220—202 8 Claims



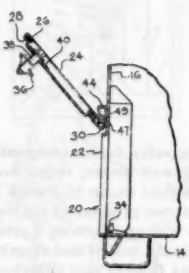
7. (Amended) In a venting system for a liquid-containing tank having pressure-venting means for venting said tank to atmosphere whenever the pressure differential therebetween exceeds set limits, the improvement comprising roll-over valve means between said tank and said pressure-venting means, said roll-over valve means including means providing at least one venting passageway of sufficient size to allow free passage of vapor therethrough and small enough to impede the flow of liquid *from said tank* therethrough, and an inhibiting valve *disposed to be contacted by liquid from said tank*, the flow of said liquid *through said venting passageway* being sufficiently impeded in a roll-over situation to allow pressure of said liquid against said inhibiting valve to trigger said inhibiting valve into a closed position for preventing pressure of liquid from said tank.

4,033 476

SIDE DOOR BIN WITH IMPROVED HINGE SUPPORT

Duane R. Greenquist, Beatrice, Nebr., assignor to Hoover Ball and Bearing Company, Saline, Mich.

Filed Sept. 3, 1976, Ser. No. 720,147
Int. Cl.² B65D 43/14, 51/04
U.S. Cl. 220—334 5 Claims



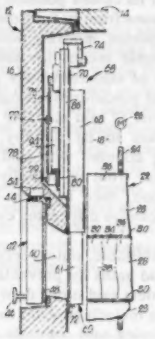
1. In a bin for storing and transporting bulk material and having a top wall, vertical side walls, a horizontal bottom wall, a discharge opening in one of said side walls and a door mounted on said one side wall for movement to a closed position overlying said opening, the improvement comprising hinge means mounted on said one side wall at a position above said discharge opening for hingedly mounting said door on said bin, said hinge means comprising a hinge bar mounted on said one side wall in a generally horizontally extending position above said opening, said bar having a pair of horizontally spaced ends, substantially horizontally aligned door support pins mounted on said bar ends and positioned therebelow so that said pins extend toward each other and terminate in a horizontally spaced relation, said door having inverted U-shaped sections on the upper end thereof rotatably supported on said pins.

4,033,477

DISPENSING APPARATUS HAVING PRODUCT ACCESS DOOR SEQUENTIAL CONTROL MECHANISM

William C. Hoppe, and Theodore L. Hanson, both of Kansas City, Mo., assignors to The Vendo Company, Overland Park, Kans.

Filed Mar. 25, 1976, Ser. No. 670,266
Int. Cl.² B65G 59/00
U.S. Cl. 221—114 15 Claims



1. In product dispensing apparatus:

product enclosing means for housing products to be dispensed,

said enclosing means having an internal zone including a plurality of individual stations from which products are to be dispensed by user removal thereof,

said enclosing means being provided with aperture means for presenting paths for user access to each of said stations respectively;

individually shiftable closure means for each of said paths respectively mounted on said enclosing means for obstructing the corresponding path to user access when said closure means is in a closed position thereof and clearing the corresponding path for user access when said closure means is shifted to an open position thereof;

releasable holding means for each of said closure means respectively mounted on said enclosing means for normally holding the corresponding closure means in its closed position;

actuating means mounted on said enclosing means for initiating a successive product dispensing cycle of said apparatus in response to each successive actuation of said actuating means;

dispensing control means mounted on said enclosing means and including releasing means operably associated with said holding means and operable in response to each successive actuation of said actuating means for releasing one of said holding means, while leaving the remaining holding means in their holding condition, with the various holding means being so released sequentially in a predetermined order during successive dispensing cycles of said apparatus,

said dispensing control means further including opening means operably associated with said closure means and operable in response to each successive actuation of said actuating means for shifting an individual closure means whose corresponding holding means has been released from said closed position to said open position thereof, while leaving the remaining closure means in their closed position, with the various closure means being so opened sequentially in said predetermined order during successive dispensing cycles of said apparatus,

said releasing means and said opening means also including movable means common to said holding means and said closure means and movable relative thereto between standby and fully displaced positions of said movable

means, indexable means shiftably carried by said movable means and including means shiftable into respective positions thereof for first engaging a corresponding one of said holding means to release the latter and then engaging means on the corresponding closure means to shift the latter from its closed position to its opened position during movement of said movable means from its standby position to its fully displaced position and finally engaging the closure means that has been shifted to its opened position for finally shifting the latter from its opened position back to its closed position during movement of said movable means from its fully displaced position back to its standby position, indexing means operably coupled with said indexable means for shifting the latter into successive ones of said respective positions thereof sequentially in said predetermined order during successive return movements of said movable means from its fully displaced position to its standby position, and drive means operably coupled with said movable means for moving the latter from its standby position to its fully displaced position, then back to its standby position, during each successive dispensing cycle of said apparatus; and

normally closed, shiftable, outer, access door means common to all of said paths for preventing user access to any of said paths unless said outer door means is open,

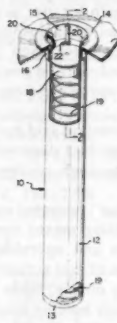
said control means including means for inhibiting said drive means from moving said movable means from its fully displaced position to its standby position to close an opened closure means unless and until said outer door means is in its closed condition.

4,033,478

CUP DISPENSER

Bruce F. House, Miami, Fla., assignor to Shelley Manufacturing Company Division of Alco Food Service Equipment Company, Miami, Fla.

Filed Dec. 22, 1975, Ser. No. 642,783
Int. Cl.² B65G *59/00*
U.S. Cl. 221—279 **1 Claim**



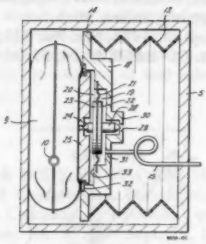
1. A self-service dispenser for disposable paper cups and the like comprising, in combination, a vertically-extending, open-top container, a plurality of arcuate leaf springs arranged within the upper end of said container in radially-inwardly-extending, downwardly-directed disposition, means for securing the upper ends of said arcuate leaf springs with respect to the upper end of said container in peripherally-spaced relation thereabout, a plurality of side openings in said container, one for each of said leaf springs, the lower ends of said arcuate leaf springs extending one each through said side openings for free movement therethrough upon radially outward flexure of said springs, and means for resiliently urging upside-down stacked frusto-conical cups in said container in the upward direction so that the peripheral lower end of the uppermost cup of the stack contacts underside portions of said arcuate leaf springs, said leaf springs being of such size and so positioned at the upper end of said container that the uppermost cup of the stack will project outwardly of the upper end of said container for convenient grasping for removal during a self-service cup dispensing operation, an annular flange secured to and extending outwardly of the upper end of said container; said means for resiliently urging stacked cups in said container in the upward direction comprising a cylindrically skirted pressure head slidably fitted in said container, spring support means at the lower end of said container, and a helical compression spring constrained between said spring support means and the underside of said pressure head; means preventing inward movement of said lower ends of said arcuate leaf springs through their respective side openings in said container; said means preventing inward movement of said lower ends of said arcuate leaf springs comprising downwardly-bent portions integrally formed at the lower ends of each of said springs and operative to abut outer wall portions of said container; said annular flange being integrally formed with an inner cylindrical skirt telescopingly secured within a marginal upper end portion of said container; and said means for securing the upper ends of said leaf springs with respect to the upper end portion of said container comprising peripherally-spaced slots in said flange skirt portion through which upper end portions of said leaf springs extend, and spot welds securing terminal upper end portions of said leaf springs to the underside of said annular flange.

4,033,479

PRESSURE MODULATING VALVE

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of, and David S. Jacob, Irvine, Calif.

Filed July 26, 1976, Ser. No. 708,795
Int. Cl.² B67D *5/28, 5/14*
U.S. Cl. 222—61 **11 Claims**



1. A modulating valve device comprising first and second relatively movable wall means, respectively for transmitting force applied by a fluid motor to a work instrumentality and for sensing the reactive pressure of the work, a valve housing having a movable wall and forming a pressure chamber, first and second ports in the wall of said chamber, respectively, for admitting actuating fluid to said chamber and directing said fluid to the fluid motor, a valve actuable by said movable wall and cooperable with said second port, and a connection between said sensing wall means and said movable wall acting on said movable wall in opposition to the effect of the actuating fluid thereon.

4,033,480

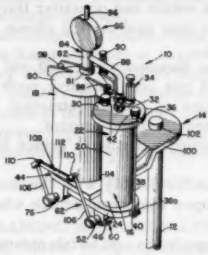
MULTIPLE FLUID DISPENSER

Anthony E. Di Maio, Georgetown, Mass., assignor to Marson Corporation, Chelsea, Mass.

Filed June 17, 1975, Ser. No. 587,655
Int. Cl.² B67D *5/54*
U.S. Cl. 222—129 **14 Claims**

1. Apparatus for dispensing a plurality of materials in a predetermined ratio comprising at least two separate con-

tainer means each of which contains a material, valve means including a valve member associated with each of said container means and being actuatable for enabling flow discharge of the material from each of said container means in a predetermined amount and second means including an interconnecting member being operatively interconnected to each of said valve members for actuating said valve means and thereby enabling the simultaneous discharge accurate control of the materials from said two container means said valve



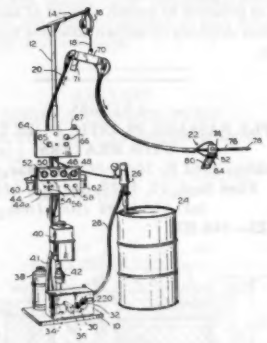
means includes an outlet opening having a predetermined size, said adjustment means includes a manually grippable and generally flat rotatable metering plate having a plurality of different dimensioned dispensing orifices, each with dimensions smaller than said outlet opening and being circumferentially spaced from each other for permitting the flow of fluid therethrough, and detent means for selectively locking each of said dispensing orifices adjacent said outlet opening for enabling adjustment of the flow rate from said one container means.

4,033,481

LIQUID MATERIAL-DISPENSING APPARATUS

Prentiss C. Hicks, and Fred C. Turrentine, both of Portland, Oreg., assignors to Artek Industries, Inc., Portland, Oreg.

Division of Ser. No. 332,345, Feb. 14, 1973, Pat. No. 3,876,114. This application Dec. 26, 1974, Ser. No. 536,534
Int. Cl.² B67D *5/34*
U.S. Cl. 222—134 **5 Claims**



1. In a liquid-dispensing system sherein first and second liquid components are caused to flow separately to a mixing and dispensing means,

said mixing and dispensing means comprising:

a dispensing head,

means defining a component-mixing chamber in said head,

means defining a first component infeed passage leading into said head and having a first component infeed port within said head opening into said mixing chamber,

means defining a second component infeed passage leading into said head and having a second component infeed port within said head opening into said mixing chamber,

a dispensing passage means leading from said mixing chamber through said dispensing head,

a fluid pressure-operated piston movable within a piston cavity in said dispensing head, said piston cavity being sealed from communication with said mixing chamber and said infeed passages,

piston-operated means in said head for simultaneously opening and closing said first and second infeed ports upon movement of said piston in opposite directions within said cavity,

fluid passage means extending into said head and opening into said piston cavity for admitting fluid under operating pressure to one side of said piston for moving said piston in a direction for opening said ports,

and means in said head on the opposite side of said piston urging said piston in a direction for closing said ports,

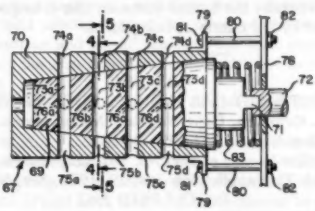
said mixing chamber, said first infeed port, said second infeed port and said piston cavity being in axial alignment, said piston-operated means comprising first and second movable valve members in said head at said infeed ports and a piston rod means extending axially from said piston in said piston cavity into operable association with said movable valve members.

4,033,482

CONICAL LIQUID METERING DEVICE

Jack Kushner, Lindenhurst, and Henry G. Zwirblis, Nesconset, both of N.Y., assignors to Delta Scientific Corporation, Lindenhurst, N.Y.

Division of Ser. No. 501,875, Aug. 30, 1974, Pat. No. 3,999,945. This application Nov. 20, 1975, Ser. No. 633,856
Int. Cl.² B67D *5/52*
U.S. Cl. 222—136 **11 Claims**



1. A device for precisely metering out quantities of fluid, comprising:

a. a tapered rotor having a chamber having first and second openings which are in fluid communication with each other;

b. a mating housing for receiving said rotor, said housing having:

1. an input port for communicating with one opening of said chamber when said rotor is in a first position with respect to said housing,

2. an overflow port for communicating with the other opening when said input port is in communication with said one opening,

3. a pressure port for communicating with one opening when said rotor is in a second position with respect to said housing, and

4. an output port for communicating with the other opening when said pressure port is in communication with said one opening; and

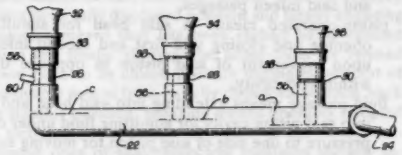
c. overflow receiving means connected to said overflow port.

4,033,483

REMOTE LIQUOR DISPENSING SYSTEM

Samuel W. Neidorf, 4615 Rubio Drive, Encino, Calif. 91316

Filed Nov. 28, 1975, Ser. No. 636,305
Int. Cl.² B67D 5/60
U.S. Cl. 222—145 3 Claims



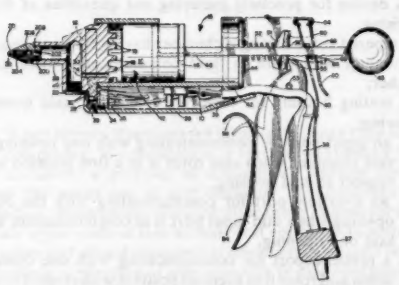
1. In a gravity feeder for a liquor distribution system:
   a. a manifold having a vented chamber;
   b. means forming an outlet from the chamber adapted to connect with a liquor supply line;
   c. a plurality of upwardly opening nipples for individual cooperation with upended liquor bottles, the openings of said nipples being at various levels, said nipples communicating with said manifold chamber;
   d. a plurality of feeder caps each cooperable with a liquor bottle and with a nipple for establishing communication therebetween, each feeder cap having one end detachably engageable with the neck of its companion bottle and having its other end provided with a register telescopicaly surrounding the corresponding nipple, each feeder cap having an abutment engaging the nipple to limit telescopic movement and to transmit the weight of the bottle of the nipple;
   e. a flexible feeder tube for each cap and projecting into the manifold through the corresponding nipple for establishing communication between the corresponding bottle and said manifold chamber;
   f. the feeder tubes of the companion feeder caps being of the same nominal length whereby the lower ends of said feeder tubes terminate at various levels in the manifold chamber corresponding to said levels of said nipple openings whereby the bottles come on line in sequence determined by the nipple opening level.

4,033,484

HOT MELT CARTRIDGE ADHESIVE GUN

Robert L. Ornsteen, Cape Neddick, Maine, assignor to Ornsteen Chemicals, Inc., Seabrook, N.H.

Continuation-in-part of Ser. No. 562,212, March 26, 1975, abandoned. This application Jan. 29, 1976, Ser. No. 653,598
Int. Cl.² B67D 5/62
U.S. Cl. 222—146 HE 13 Claims



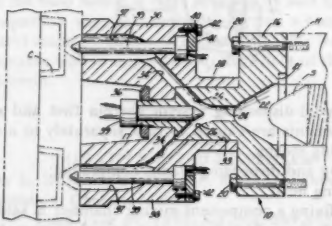
1. A hot melt adhesive gun for use with a cartridge of normally solid thermoplastic adhesive, said gun comprising:
   a handle;
   a gun housing of thermally insulative non-stick material mounted on the handle and defining a chamber having an opening in a wall thereof for insertion of said cartridge, said chamber being sufficiently cool to retain said adhesive cartridge in substantially solid form;
   adhesive cartridge driving means disposed for slidable movement in said chamber through a predetermined distance and including a plunger rod extending through the rear wall of said chamber and rearwardly of said gun;
   infinitely resolvable ratchet means supported by said handle and in operative engagement with said driving means;
   an actuating trigger supported by said handle and coupled to said ratchet means and operative throughout its rearward travel to urge said driving means forward against said cartridge;
   retraction means disposed about said rod extending rearwardly of said gun and operative upon release of said actuating trigger to permit retraction of said driving means by a predetermined amount;
   nozzle means having a discharge orifice for molten adhesive;
   valve means communicating with the nozzle means and operative to open the nozzle orifice when the trigger is actuated;
   a heater block coupled to said nozzle means and disposed at the forward end of said chamber and including;
   a face confronting said chamber and into engagement with which the front of said adhesive cartridge is urged for melting;
   at least one electrical heating element disposed in said block for heating said block to an operating temperature sufficient to melt said adhesive in engagement with said face;
   a reservoir in said block for maintaining a quantity of molten adhesive therein;
   a first passage in said block coupling said face to said reservoir; and
   a second passage in said block coupling said reservoir at a level above the level of said first passage to said nozzle means;
   whereby when said drive means is urged against said cartridge, pressure is provided to deform a partially melted portion of said cartridge against the walls of said chamber to provide a seal against backflow of molten adhesive and to force molten adhesive through said first passage and said reservoir and to open said valve means to permit flow of molten adhesive through said second passage, and out through said nozzle; and whereby upon release of said actuating trigger, retraction of said driving means causes relief of pressure to permit closure of said valve means to minimize dripping of molten adhesive from said discharge orifice.

4,033,485

MULTIPLE PASSAGE PLASTIC INJECTION NOZZLE WITH HEATERS

Arthur Kohler, 3942 E. 364th St., Eastlake, Ohio 44094

Filed Sept. 19, 1975, Ser. No. 616,758
Int. Cl.² B29F 1/06, 1/08
U.S. Cl. 222—146 HE 5 Claims



1. Apparatus for distributing a single stream of liquid plastic into a multiplicity of streams for injection molding comprising,

a plastic receiving member and a plastic discharge member,

said plastic receiving member having plastic receiving means including a receiving passage and including an opening for receiving plastic from an injection molding machine, a heater disposed within said plastic passage, and a plurality of plastic conveying channels communicating with said receiving means each having outlet openings,

said plastic discharge member having a plurality of plastic discharge means each extending from an entrance opening to a discharge opening,

means to detachably interconnect said receiving member and said discharge member as a unitary assembly.

said conveying channels and said discharge means being selected in number and positioned such that the outlet opening at each of the conveying channels communicates with the entrance opening of one of the discharge means when said members are interconnected.

4,033,486

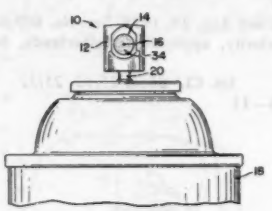
ANTI-FOAMING ASSEMBLY AND METHOD

David L. Kirkel, Mount Prospect, Ill., assignor to Seaquist Valve Company, Cary, Ill.

Filed Nov. 13, 1975, Ser. No. 631,667

Int. Cl.² B67D 5/58

U.S. Cl. 222—190 **10 Claims**



1. A terminal orifice assembly for use with aerosol and finger pump type dispensers, said assembly having terminal orifice means formed therein and an anti-foaming composition disposed in continguous relation to said terminal orifice means and in communicating relation with foam issuing from said terminal orifice means, said anti-foaming composition being disposed on the exterior surface of said assembly adjacent said terminal orifice means.

4,033,487

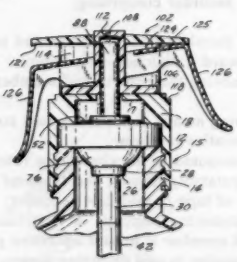
DOUBLE TRIGGER PUMP

Lewis A. Micallef, Fort Lee, N.J., assignor to Leeds and Micallef, Fort Lee, N.J.

Filed Oct. 8, 1975, Ser. No. 620,565

Int. Cl.² G01F 11/08

U.S. Cl. 222—207 **18 Claims**



1. A double acting trigger mechanism for a dispensing pump of the type employing a reciprocal plunger having an axis and a passage for communicting the pump with a nozzle, the trigger mechanism including a housing, a body portion at least partly within the housing and being disposed transversely of the axis, a pair of spaced handles extending transversely from the body portion exteriorly of the housing and to permit manual engagement therewith, coupling means for coupling the trigger mechanism with the plunger, means forming a slide surface in the housing on which the body portion is adapted to slide, pivoting means for permitting pivoting of the trigger mechanism so that manual movement of either handle in a direction transverse of the axis will pivot the body portion and slide the body portion on the slide surface and move the plunger in an axial direction and release of such handle will permit the plunger to reciprocate to the original position by pivoting the body portion and handle to their original position.

4,033,488

HARNESS ARTICLE CARRIER

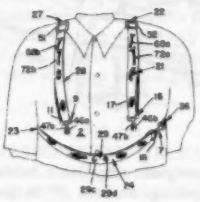
Robert A. Brewer, 15 Castle Park Way, Oakland, Calif. 94611

Continuation-in-part of Ser. No. 422,734, Dec. 7, 1973, Pat. No. 3,884,403. This application Mar. 17, 1975, Ser. No. 558,781

The portion of the term of this patent subsequent to May 20, 1992, has been disclaimed.

Int. Cl.² A45F 5/00

U.S. Cl. 224—5 V **1 Claim**



1. In combination, a first article, and a harness which is convertible to a neck strap which are both adapted to releasably hold said article against the chest of the wearer in a carrying position and permit selective eye level positioning in an operating position in either the neck strap of harness mode comprising:

a. said first article having a pair of apertured coupling elements thereon;

b. a neck strap consisting of a single flexible non-elastic elongated member;

c. a first spring releasable coupling member attached to a first end of said neck strap and dimensioned to releasably couple to one of said apertured coupling elements on said article when used in said neck strap mode;

d. connecting means attaching said second end of said neck strap to said first article;

e. an extension strap consisting of a single flexible non-elastic elongated member for selective use in said harness mode;

f. a second spring releasable coupling member attached to a first end of said extension member and dimensioned to releasably couple to the other of said apertured coupling elements on said first article;

g. a coupling means attached to the second end of said extension member for releasably coupling to said first spring releasable coupling element when used in said harness mode;

h. said extension strap and neck when coupled together in said harness mode consists of a flexible non-elastic elongated member having the following portions and having a length adapted to span the distance from the wearer's chest (first chest portion), over one shoulder (first shoulder portion), under the arm (first under arm portion), across the chest (transverse chest portion), under the second arm (second under arm portion), over the second

shoulder (second shoulder portion), and back to the chest (second chest portion);

i. first quick release fastener means mounted on said first article below said apertured coupling element for releasably connecting said article to said extension member;

j. second quick release fastener means connected to said strap extension member adjacent said second end whereby said second quick release fastener means is adapted for location in the mid-portion area of the front of the wearer's chest;

k. said first quick release fastener means on said first article includes a portion of a snap coupling; and

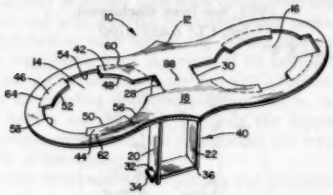
l. said second quick release fastener means includes the mating portion of said snap coupling.

4,033,489

DISPOSABLE CUP HOLDER

Gary K. Fowler, 720 10th Ave., Apt. No. 4, Fairbanks, Alaska 99701

Filed Nov. 7, 1975, Ser. No. 629,892
Int. Cl.² A47G *23/06*
U.S. Cl. 224—48 C **13 Claims**



1. An integral one piece disposable holder for paper cups and the like comprising: a sheet of inexpensive disposable material, said sheet having at least two openings, each being shaped to hold a cup, a lateral rib between said openings, two elongate strips of material each having one of its ends integral with an opposed edge of said rib and adapted to depend from the portion of the periphery of an associated opening formed by said rib, means enabling portions of said two strips of material adjacent their other ends to be secured directly to each other to thereby constitute a depending central means to provide lateral support for cups placed within said openings.

13. An integral one piece disposable holder for paper cups and the like consisting of a sheet of inexpensive disposable material, said sheet having at least two openings, each being shaped to hold a cup, a lateral rib means between said openings, the periphery of at least one of said openings having at least three radially inwardly projected lug means circumferentially spaced apart around the periphery of the opening to provide discontinous annular cup engaging means, and portions of said sheet material derived from material within each of the openings depend from and are structurally integrally joined to said lateral rib means, said portions providing a depending hand hold support.

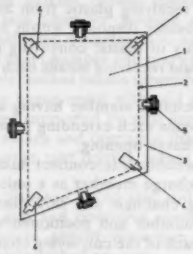
4,033,490

MANUFACTURE OF A WINDOW BY BREAKING THE EDGES OF A SHEET OF GLASS ALONG A SCORE

Moreno Ulivi, Pisa, Italy, assignor to Saint-Gobain Industries, Neuilly-sur-Seine, France

Filed July 28, 1976, Ser. No. 709,405
Claims priority, application France, Aug. 1, 1975, 75.24075
Int. Cl.² B26F *33/06;* **C03B** *33/04*
U.S. Cl. 225—1 **9 Claims**

1. An apparatus for severing the peripheral portion of a sheet of glass along a line of varying curvature scored on the surface of the glass comprising means for applying heat to the glass adjacent markedly curved sections of said score to at least partially sever said portion and mechanical means for breaking off said portion in the event it is not severed by application of heat, said mechanical means acting on the glass



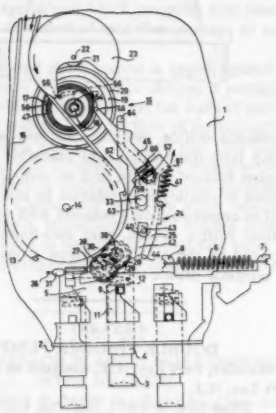
adjacent a straighter section of said score and subsequent to the application of heat by said first named means.

4,033,491

TAPE RECORDER MECHANISM RESPONSIVE TO TAPE STOPPAGE

Ghislanus Matheus Antonius Maria Aldenhoven, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,015
Claims priority, application Netherlands, Sept. 2, 1974, 7411602
Int. Cl.² B65H *25/12, 25/32*
U.S. Cl. 226—11 **13 Claims**



1. In a tape recorder comprising:

a chassis;

a command member movably connected to the chassis and biased toward a switched-off position;

means for moving the commmand member to an operative position;

biased latching means for latching said command member in the operative position;

a flywheel mounted to the chassis for rotation;

means for rotatably driving the flywheel and for causing transport of tape in said tape recorder;

means for detecting stoppage of tape transport while said command member is in said operative position, and

means responsive to said detecting means, for switching off said driving means, comprising a frame plate movably mounted to the chassis for a given motion from an initial position upon detection of tape stoppage, a force transmitting member arranged to operatively engage said

latching means so as to unlatch said command member, and means for applying operative force to said force transmitting member in response to said given motion of the frame plate,

the improvement comprising:

a drive wheel rotatably journalled on the frame plate, and means responsive to said given motion for engaging said drive wheel for frictionally driven rotation responsive to the flywheel rotation, and wherein

said force transmitting member is drivably coupled to said drive wheel for applying said operative force to said force transmitting member.

4,033,492

LOOPER

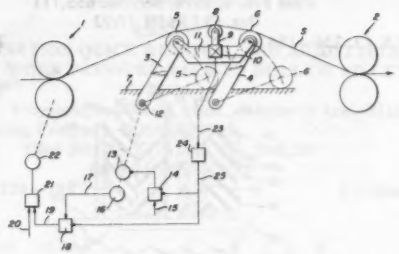
Isao Imai, Yokohama, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Filed Apr. 19, 1976, Ser. No. 678,412

Claims priority, application Japan, Apr. 30, 1975, 50-52234

Int. Cl.² B65H *25/00*; B21B *37/06*

U.S. Cl. 226—25 **6 Claims**



1. A looper wherein a sensor means capable of detecting the tension is attached to a looper arm which may be rotatable or tiltable vertically and wherein a roller bearing box in which a looper roller is rotatably supported is vertically pivotably to the upper end of said looper arm, and mounted on said looper arm are sensor means which support said roller bearing box and an accelerometer for detecting the acceleration of said looper roller.

4,033,493

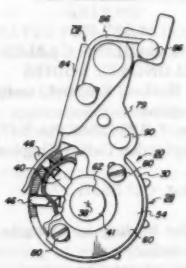
PIN WHEEL FEEDING DEVICE

Leo Levinson, Berkeley, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 23, 1976, Ser. No. 660,556

Int. Cl.² G03B *1/24*

U.S. Cl. 226—81 **12 Claims**



1. A pin wheel feeding device comprising:

a housing capable of being rotated about an axis and having a peripheral wall containing a plurality of oenings formed therein, each opening lying along a radial line extending from said axis;

a plurality of substantially identical pins disposed within said housing in respective alignment with said plurality of openings, each pin capable of being moved along the respective radial line from a first position in which it is substantially entirely located within said housing to a second position in which it projects a predetermined distance from the respective aligned opening, each pin including a pair of opposing guide members, the point on each guide member located closest the opposing guide member lying substantially along the respective radial line; and

a cam member disposed within said housing and capable of being fixed in position relative to said housing, said cam member having a track formed thereon with which each of said pins is engaged with the pair of guide members thereof being located on either side of said track, said pins following the path of said track during rotation of said housing relaive to said cam member, said track having a first segment capable of maintaining a pin engaged therewith at said first position, a second segment capable of maintaining a pin engaged therewith at said second position, and a third segment intermediate and contiguous with said first and second segments for enabling a pin engaged therewith to move between said first and second positions during rotation of said housing, the width of said track at said first, second and third segments being substantially coextensive with the locus of points traced by the closest adjacent points on the pair of guide members of each pin during movement of the pins along the first, second and third segments of said track.

4,033,494

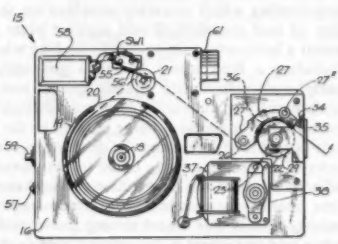
STAMP DISPENSING MECHANISM

Charles G. Middleton, Arlington Heights, and Vincent F. Volpe, Niles, both of Ill., assignors to Gard, Inc., Niles, Ill.

Filed June 17, 1976, Ser. No. 697,025

Int. Cl.² B65H *17/22*

U.S. Cl. 226—83 **14 Claims**



1. A dispensing mechanism for units of equal dimensions as a strip having equally spaced transverse rows of perforations, such as a strip of stamps, which comprises:

support means including a vertical support plate having front and rear portions, said support means being constructed to support on the rear portion of one side of said plate a roll of a strip having equally spaced transverse rows of perforations for rotation of the roll about a horizontal axis;

a Geneva drive system comprising:

a Geneva star wheel assembly that includes:

a star wheel having a central hole for rotatably mounting said wheel by a shaft that is mounted on said support plate, said star wheel having a number of equally spaced radial slots extending inwardly from the peripheral surface of said star wheel to provide a number of teeth, said teeth at their distal ends providing a cylindrical outer peripheral surface of said

wheel except for an intermediate portion of the outer surface of each tooth that has a concave surface having the same radius of curvature for all teeth; and

a Geneva driver assembly including:

a driver pin; and

pin-mounting means that has a hole for mounting on a shaft that is mounted on said support plate, with said pin being mounted on said pin-mounting means to extend with the axis of the pin parallel to and spaced from and at one radius from said hole of said pin-mounting means, said pin-mounting means having a portion that extends in the same direction that said pin extends and that is between two radii from said hole other than the radius at which said pin is mounted, said extension of said portion of said pin-mounting means having a cylindrical peripheral surface:

that is between parallel planes passing through and normal to the longitudinal axis of said pin;

that has its center of curvature at the center of said hole;

that has a radius of curvature that is approximately the radius of curvature of the concave surface portion of each tooth of said star wheel; and

that has its ends at a plane that is parallel to the axis of said pin and that passes through the radius from said hole to said pin,

said Geneva drive system being mounted on said shafts on said support plate so that said star wheel and said pin-mounting means are rotatable at horizontal axes that are spaced from each other so that said driver pin, during rotation of said pin-mounting means moves into and then out of one radial slot of said star wheel during one revolution of said pin-mounting means to move said star wheel one step of its rotation, after said extension of said portion of said pin-mounting means has its cylindrical surface moves from the cavity of a tooth and before it enters a cavity of another tooth;

motor means mounted on said support plate;

means operatively connecting said motor means to said pin-mounting means at its said hole to rotate said pin-mounting means about a horizontal axis during the operation of said motor means;

a strip-feeding wheel assembly mounted on the front portion of said one side of said support plate for rotation about a horizontal axis, said strip-feeding wheel assembly including a feed wheel having a generally cylindrical peripheral surface with equally spaced rows of projections extending outwardly from said cylindrical surface, each row of projections being parallel to the longitudinal axis of said feed wheel and the distance between adjacent rows of projections being equal to the distance between adjacent rows of the perforations of said strip;

means operatively connecting said strip-feeding wheel assembly to said star wheel to step move said feed wheel when said star wheel is step moved, said feed wheel being in alignment with a roll of the strip mounted on said support means; and

guide means mounted on said one side of said support plate adjacent said feed wheel and including:

an enclosure at the end of the front portion of said support plate and having a horizontal opening through which the strip of stamps being moved by said feed wheel is dispensed after leaving said feed wheel;

an arcuate guide pivotally mounted on one side end portion for movement about a horizontal axis that is adjacent said feed wheel and that is at a vertical plane between said feed wheel and said position of mounting of the roll of the strip, said arcuate guide having an arcuate surface with the radius of curvature approximately that of the radius of said feed wheel so that the arcuate surface can be positioned close to a portion of the cylindrical surface of said feed wheel during the operation of the mechanism, to maintain the strip in engagement with said rows of projections on said feed wheel during the dispensing operation, and so that, before starting the use of the mechanism, said arcuate guide can be pivoted away from said feed wheel to train the strip around a portion of said feed wheel after a roll is loaded on said mechanism and then returned to the position in which the arcuate surface is closely spaced from said feed wheel, said arcuate surface of said arcuate guide having arcuate grooves that are coplanar with said rows of projections of said feed wheel so that said rows of projections of said feed wheel can pass through said grooves with clearance during the turning of said feed wheel;

a locking pin mounted on the distal end portion of said arcuate guide; and

spring means biasing said pin into a hole in said support plate that locks said arcuate guide in the position at which said arcuate surface is closely spaced from said feed wheel.

4,033,495

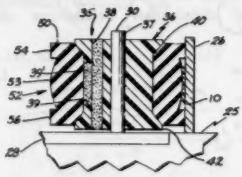
TAPE DRIVE APPARATUS

Stephen A. Platt, Grand Haven, Mich., assignor to Stephen A. Platt and Vernet B. Platt, both of Grand Haven, Mich.

Filed Feb. 6, 1976, Ser. No. 655,711

Int. Cl.² B65H 17/22

U.S. Cl. 226—186 **2 Claims**



1. For use in a magnetic tape playback apparatus, a pinch roller movable between operative and inoperative positions for cooperting with a tape drive capstan, said pinch roller comprising: a spool having a central aperture and a tire mounted to said spool, said tire including a circumferentially recessed and convexly curved portion defining annular shoulders on opposite sides of said recess such that tape positioned between said annular shoulders is held between said pinch roller and said capstan with said shoulders engaging the capstan for providing positive drive between the pinch roller and the capstan when said roller is in the operative position, and wherein said spool further includes a plurality of tire mounting apertures extending longitudinally through said spool and radially spaced from said central aperture each tire mounting aperture including a slot extending radially outwardly through said spool to communicate with said tire, and a bonding adhesive filling said slots to bond said tire to said spool.

4,033,496

APPARATUS FOR HAULING CABLES OR OTHER ELONGATE BODIES

Hugh Hieron Rolfe, Harlow, England, assignor to The Post Office, London, England

Filed Jan. 7, 1976, Ser. No. 647,145

Claims priority, application United Kingdom, Jan. 13, 1975, 1406/75

Int. Cl.² B65H 17/12

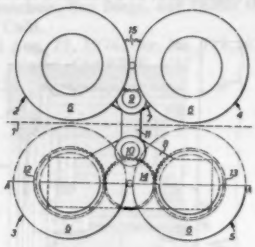
U.S. Cl. 226—188 **17 Claims**

1. An apparatus for hauling an elongate body such as a cable, the apparatus including:

a plurality of pairs of traction wheels, each pair being mounted tandem fashion relative to the other of the pairs so as to define a path for the elongate body,

resilient wheel bias means to resiliently bias the wheels of

each pair into contact with the elongate body on opposite sides of the axis thereof, which body is therefore gripped, in use, by the wheels,



a plurality of motors to drive the traction wheels, each pair of traction wheels having at least one respective motor, and

a mechanical coupling constraining one wheel of one pair to rotate conjointly with one wheel of another pair.

4,033,497

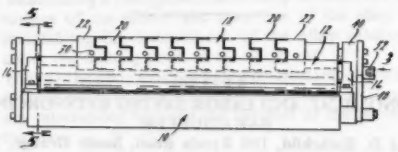
COMBINATION QUICK REMOVAL AND ADJUSTABLE WIDTH WORK PRESSURE BACK-UP ROLL OR BILLET ROLL

Witold C. Przygocki, Southfield, Mich., assignor to Acme Manufacturing Company, Ferndale, Mich.

Filed July 30, 1976, Ser. No. 710,257

Int. Cl.² B65H *17/20*

U.S. Cl. 226—194 **5 Claims**



1. The combination of billet and support rolls with means for mounting such rolls, such mounting means including fixed bearings for mounting a pair of support rolls, a billet roll retainer for mounting said billet roll at one end, split retainer halves for mounting said billet roll at its opposite end, pivot arms connected to said split retainer halves to pivot and open said split halves for removal of said billet roll, means to secure said pivot arms and said split halves together, said fixed billet roll retainer and said split bearing being constructed to permit said billet roll to freely float vertically within its retainer and thus mount said billet roll for support of said support rolls.

4,033,498

APPARATUS FOR STAPLING HEELS

Manuel Morales Roman, Angel Castana Martinez, 45 Elche, Alicante, Spain

Filed Jan. 12, 1976, Ser. No. 648,365

Claims priority, application Spain, July 5, 1974, 204415

Int. Cl.² B27F *7/00*

U.S. Cl. 227—30 **3 Claims**

1. Apparatus for stapling an element to an item of footwear comprising:

a. a base;

b. a column attached to said base;

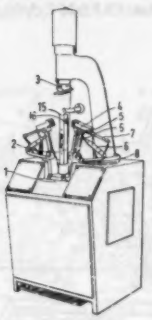
c. said column having an upper portion shaped to conform to the counter portion of said footwear;

d. a plurality of longitudinal slots in said column;

e. a plurality of hammers moveable in said slots;

f. means pivotably mounted exterior of said column for loading one staple into each of said plurality of longitudinal slots;

g. means for moving said means for loading into abutment with said column prior to said loading and clear of said column after said loading; and



h. means for driving said hammers whereby said staples are driven along said slots into said footwear and said element.

4,033,499

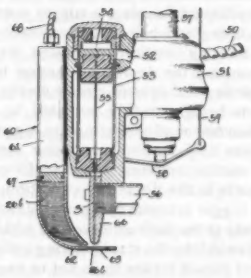
FASTENER APPLICATORS

David J. Butler, 1324 SE. 37th Lane, Cape Coral, Fla. 33904

Filed Oct. 20, 1975, Ser. No. 623,814

Int. Cl.² B25C *1/00*

U.S. Cl. 227—120 **2 Claims**



1. A fastener applicator, adapted to be held against a workpiece during operation thereof, comprising:

apparatus for driving fasteners into said workpiece, including a driver movable through a drive stroke,

a first magazine containing a plurality of fasteners, and means feeding individual fasteners to alignment with said driver so that upon movement of the latter through its drive stroke it strikes the aligned fastener and drives it from said driving apparatus and into said workpiece wherein an outer portion of said fastener overlies said workpiece,

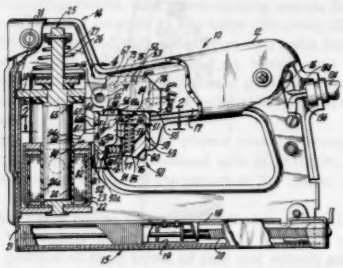
a second magazine connected to said driving apparatus and having a plurality of thin tabs stored therein, each tab having a surface area larger than said fastener outer portion.

said second magazine comprising an elongated tubular portion wherein the tabs are contained crosswise thereof and in face-to-face relation, said tubular portion having a tab-exit part curved in the direction toward the place where said individual fasteners are fed to alignment with said driver, said exit part terminating in a narrow slit through which individual tabs are fed for alignment with the driver and driven fastener.

4,033,500
ELECTROMAGNETIC STAPLER AND SAFETY TRIGGER THEREFOR

George Frank Manganaro, Garfield, N.J., assignor to Electro-Matic Staplers, Inc., Saddle Brook, N.J.

Filed Mar. 26, 1976, Ser. No. 670,649
Int. Cl.² B25C 5/06
U.S. Cl. 227—131 10 Claims



1. A staple driving tool comprising a body, a load coil in said body, said coil having an opening, armature means disposed in said body and slidable in said opening for movement by said coil when the coil is energized, staple driving means fixed to said armature means and disposed at the front of the body, a staple magazine at the lower end of said body, a switch on said body, control circuit means interconnecting line current supply to said coil and switch, said control circuit means comprising means to energize said coil to a charge so that said staple driving action is at the desired force, and further comprising time delay pulse means so that the time delay pulse between shots is greater than the time to disengage the switch, a trigger, said trigger comprising a housing, a trigger member slidably engaging said housing and being depressable by the user in relation to the housing, motion responsive means adjacent said trigger to transmit the depressing motion to actuate the switch for completing the control circuit means, said motion responsive means being movably mounted to said housing whereby upon movement of said armature means, said armature means strikes said motion responsive means so as to disengage said motion responsive means from said switch while said trigger is in the depressed condition, whereby depression of said trigger actuates said switch causing the staple driving action only at the desired force and whereupon disengagement of the switch by the staple driving action, the switch opens the control circuit means so as not to energize the coil until the trigger is again depressed.

4,033,501
FRICTION WELDING MACHINE

Peter C. Ambrose, Jr., Manchester, and Ronald F. Knapp, Coventry, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

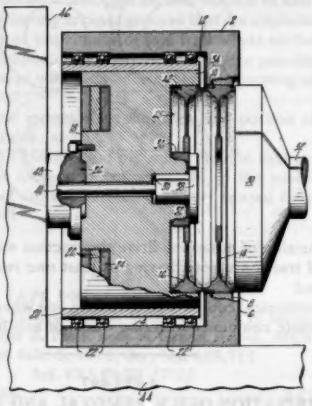
Filed June 9, 1976, Ser. No. 694,403
Int. Cl.² B23K 28/00
U.S. Cl. 228—2 11 Claims

1. In a friction welding machine for bonding workpieces together, the improvement comprising a unitized headstock and tailstock assembly including:

a. a rigid tailstock housing having an internal wall which defines a cylindrical bore extending therethrough, tailstock workpiece fixturing means being integrally connected to and rigidly supported against said wall;

b. a cylindrical headstock flywheel rotatably and slidably supported in the bore against the internal wall of the tailstock housing, headstock workpiece fixturing means being securely supported by the end of the flywheel facing the tailstock workpiece fixturing means, said headstock and tailstock fixturing means establishing predetermined workpiece alignment,

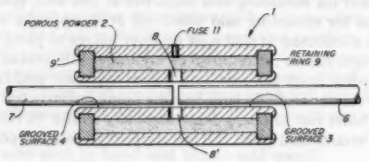
said flywheel and housing having sufficient rotational and sliding motion imparted therebetween to effect frictional workpiece engagement at a common interface, said predetermined workpiece alignment being maintained throughout such engagement by the supported workpiece fixturing means adjacent the interface and by the unitized headstock and tailstock which are incapable of radial movement with respect to one another.



4,033,502
ECONOMICAL AND LABOR SAVING REINFORCING BAR COUPLER

Ronald D. Rothchild, 106 Rynda Road, South Orange, N.J. 07079

Filed June 26, 1975, Ser. No. 590,423
Int. Cl.² B23K 23/00
U.S. Cl. 228—56 28 Claims



1. A non-removable coupling device which eliminates the need for external crucibles or removable molds for coupling together first and second elongated structural members, such as reinforcing bars, comprising:

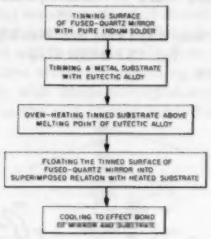
a. a first annular chamber portion formed completely within said coupling device containing means for releasing under pressure molten material upon being activated; and

b. a second chamber portion disposed centrally within said first chamber portion and opened to the atmosphere and communicating with said first chamber portion for receiving said first and second elongated structural members and said molten material therein, the width of said second chamber portion being slightly larger than the corresponding width of said elongated structural members to form a clearance gap between said elongated structural members and said coupling device for receiving said molten material.

4,033,503
METHOD FOR ATTACHING A FUSED-QUARTZ MIRROR TO A CONDUCTIVE METAL SUBSTRATE

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; George Sonnenschein, San Diego, and Daniel McKeown, La Jolla, both of Calif.

Filed Aug. 27, 1976, Ser. No. 718,267
Int. Cl.² B23K *1/02*
U.S. Cl. 228—124 4 Claims


TINNING SURFACE OF FUSED-QUARTZ MIRROR WITH PURE INDIUM SOLDER
TINNING A METAL SUBSTRATE WITH EUTECTIC ALLOY
OVER-HEATING TINNED SUBSTRATE ABOVE MELTING POINT OF EUTECTIC ALLOY
FLOATING THE TINNED SURFACE OF FUSED-QUARTZ MIRROR INTO SUPERIMPOSED RELATION WITH HEATED SUBSTRATE
COOLING TO EFFECT BOND OF MIRROR AND SUBSTRATE

1. A method for attaching a fused-quartz mirror to a conductive metal substrate comprising the steps of:

A. tinning one substantially planar surface of a fused-quartz mirror with a solder of a class including pure indium solder;

B. tinning a metal substrate with an indium eutectic alloy consisting essentially of indium, bismuth, lead and tin, having a melting point substantially below that of the solder;

C. heating the alloy to a temperature substantially above its melting point, but below that of the solder;

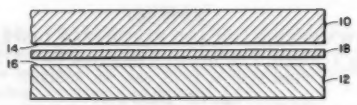
D. establishing a contiguous relationship between the tinned surface of the mirror and a surface of the alloy while maintaining the temperature of the alloy substantially above the melting point of the alloy; and

E. cooling the alloy to a temperature substantially below its melting point while maintaining the established contiguous relationship between the surfaces of the mirror and the alloy.

4,033,504
BIMETALLIC JUNCTIONS

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of; Frank G. Arcella; Gerald G. Lessmann, both of Pittsburgh, Pa., and Russell A. Lindberg, Westlake, Ohio

Filed Oct. 24, 1975, Ser. No. 625,733
Int. Cl.² B23K *15/00, 19/00*
U.S. Cl. 228—190 4 Claims



1. In a method of metallurgically joining dissimilar metallic materials which have widely differing melting points and interdiffused or form concentration gradients at elevated temperatures, the improvement comprising

separately forming at least one alloy layer homogeneously composed of the two dissimilar metallic materials,

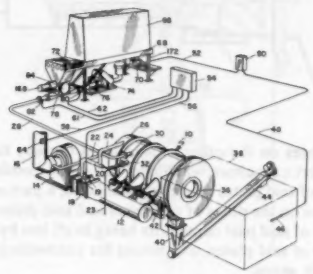
positioning said alloy layer between said dissimilar metallic materials, and

welding said two dissimilar metallic materials together whereby said alloy layer forms a dissimilar metal junction.

4,033,505
CYCLONIC, MULTIPLE VORTEX TYPE FUEL BURNER WITH AIR/FUEL RATIO CONTROL SYSTEM

Kenneth Vaughn Lutes, Escondido; Leland Golde Desmon, San Diego, and Edward Dana Dodge, Poway, all of Calif., assignors to Energex Limited, Portland, Oreg.

Filed Nov. 17, 1975, Ser. No. 632,205
Int. Cl.² F23N *1/00*
U.S. Cl. 236—15 BD 10 Claims



1. A fuel/air ratio control system for controlling combustion within a burner independently of changes in the fuel mass flow rate caused by fluctuations in the density of fuel being supplied to said burner, said system comprising:

a. fuel mass flow rate detection means for detecting the mass flow rate of a fuel being supplied to said burner independently of fluctuations in the density of said fuel, said mass flow rate detection means including a mixing conduit having a first inlet means for permitting the introduction of a first fluid to said mixing conduit, outlet means for discharging fluid from said mixing conduit, and a second inlet means intermediate said first inlet means and said outlet means for permitting the introduction of said fuel into said mixing conduit, said mass flow rate detection means further including pressure difference detection means for detecting the pressures of fluid within said conduit at a first point between said first inlet means and said second inlet means and a second point between said second inlet means and said outlet means, respectively, and providing a signal responsive to the difference between said pressures;

b. air flow detection means for detecting the flow rate of air being supplied to said burner;

c. first comparison means for comparing said flow rate of air with said fuel mass flow rate and thereby providing an actual fuel/air mass ratio;

d. variable selection means for selecting a predetermined fuel/air mass ratio;

e. second comparison means for comparing said actual fuel/air mass ratio with said predetermined fuel/air mass ratio and providing an air flow rate change signal responsive to said second comparison; and

f. control means for variable controlling said air flow rate automatically in responsive to said air flow rate change signal so as to provide said predetermined fuel/air mass ratio independently of changes in said fuel mass flow rate caused by fluctuations in said fuel density.

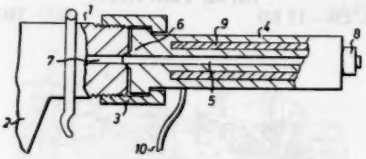
4,033,506
ELECTROSTATIC COATING GUNS

Franz Braun, Wartbuchel 14, 9422 Staad, near Rorschach, Switzerland

Filed Aug. 1, 1975, Ser. No. 600,975
Claims priority, application Switzerland, Aug. 6, 1974, 10761/74; Aug. 6, 1974, 10762/74; Aug. 6, 1974, 10763/74
Int. Cl.² B05B *5/02*
U.S. Cl. 239—15 13 Claims

1. A spray gun comprising a capacitor assembly for applying

an electrostatic field to coating material being sprayed, said capacitor assembly having at least three capacitor plates of electrically conducting material, a solid dielectric formed with opposite faces on which said capacitor plates are mounted, said plates being mounted in alternation on said opposite faces with at least one plate on one of said faces partially overlapping two plates on the other of said faces thereby forming at least two part capacitors, each part capacitor consisting of a part of one of said plates on one of said faces, a part of another of said plates on the other of said faces and said dielectric, and the number of said part capacitors being in all less by one than the number of said plates, and means for connecting said part capacitors in series.



4,033,507

FUEL INJECTION VALVE

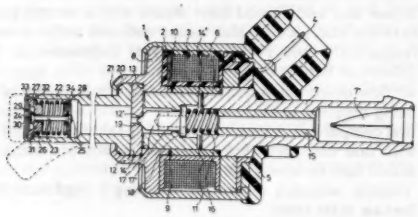
Gerhard Fromel, Hallstadt, and Peter Langenberger, Forchheim, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Jan. 14, 1976, Ser. No. 648,481

Claims priority, application Germany, Jan. 15, 1975, 2501283

Int. Cl.² B05B *1/08, 1/26, 1/32*

U.S. Cl. 239—102 **4 Claims**



1. A fuel injection valve for an internal combustion engine, said valve including a housing, and within the housing a coaxial arrangement of an internal solenoid coil, a magnetic core, a movable armature, a valve seat member, and a valve needle carried by said armature and cooperating with the valve seat in said valve seat member for metering fuel past the valve seat member, the improvement comprising:

a connecting cylinder, attached to said valve housing; and

a mechanical fuel preparation means, located in said connecting cylinder separately from and downstream of said valve seat member and said valve needle, said connecting cylinder further including a first spring support cup;

a pestle with two enlarged ends, one of said ends penetrating a central hole in said first support cup;

a second spring support cup with a central hole penetrated by the second of said two enlarged ends of said pestle; and

a spring, disposed between and urging apart said first and said second spring support cups, thereby pressing them against the enlarged ends of said pestle.

4,033,508

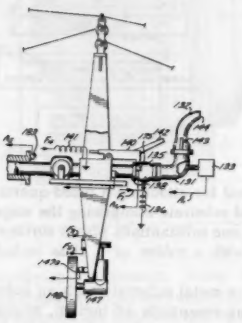
AUTOMATED IRRIGATION SYSTEM

Edgar F. Jacobi, 15962 Sunburst Lane, Huntington Beach, Calif. 92647, and Mark R. Madden, Rte. No. 2, Plainfield, Wis. 54966

Filed May 13, 1976, Ser. No. 686,104

Int. Cl.² B05B *3/12*

U.S. Cl. 239—177 **6 Claims**



1. In a center pivot irrigation system having a tubular water dispensing assembly pivotally mounted on one end and supported on a first powered carriage proximate the other end for advancing in a circular patterm, the improvement comprising:

a deployable extension adapted for telescopic receipt within said other end of said dispensing assembly;

spray dispensing means mounted on said extension;

a second powered carriage connected to slidably support said extension including sterring means for controlling the alignment thereof relative said first carriage;

limiting means connected between said other end of said dispensing assembly and said second carriage for limiting the separation distance therebetween;

latching means mounted on said second carriage for selectively retaining the free end of said extension adjacent said second carriage; and

sequencing means operatively connected between said pivot and said dispensing assembly for producing a plurality of control signals in a sequence associated with the angular positions of said assembly, selected ones of said control signals being connected to control respective ones of said second carriage means and said latching means.

4,033,509

LAWN SPRINKLER AND FERTILIZER DISPENSER

Kerney T. Sheets, P.O. Box 637, Duplessis, La. 70728

Filed Mar. 6, 1975, Ser. No. 555,957

Int. Cl.² B05B *3/02*

U.S. Cl. 239—226 **27 Claims**

1. A lawn, farm and orchard sprinkler comprising:

a. reservoir means for containing fluid solutions, suspensions, or mixtures of chemicals,

b. coupling means connected to said reservoir means, said coupling means having chamber means for conveying liquids under pressure, said coupling means including liquid inlet means for introducing liquids under pressure to said chamber means,

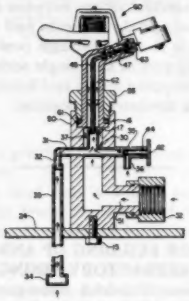
c. sprinkler head means rotatably connected to said coupling means, for sprinkler head means including:

i. nozzle means for spraying fluids,

ii. channel means connected to said nozzle means and to said chamber means for conveying liquids under pressure from said chamber means to said nozzle means;

d. manifold means connected to said coupling means for conveying fluids from said reservoir means to said nozzle means, said manifold means having a first inlet for admitting said fluids from said reservoir means, a second inlet for admitting air, and an outlet inside said chamber means for said air and said fluids;

e. flow regulating means connected to said manifold means for regulating the rate of flow of fluids from said reservoir means to said nozzle means, said flow regulating means comprising valve means for admitting air to said manifold means to mix with fluids conveyed from said reservoir means prior to the exit of said fluids from said outlet of



said manifold means, said valve means comprising hollow tube means contained within said manifold means and rotatably connected to said manifold means, said tube means having one open end and one closed end, said tube means having at least one hole in the side thereof positioned for alignment with said second inlet for admitting air upon rotation of said tube to an aligning position to permit air to enter said manifold means through said hole;

f. aspirator means located in said channel means and rotatably connected to said outlet for said air and said fluids for conveying said air and said fluids from said manifold means to said nozzle means, the outlet end of said aspirator means being located in said channel means upstream from said nozzle means; and,

g. pipe means connected to said first inlet means for conveying fluids from said reservoir to said manifold means.

4,033,510

ARC-TRAVERSING WATER SPRINKLER

James M. Jennison, Anaheim, and Henry Thomas Williams, Corona del Mar, both of Calif., assignors to Thompson Manufacturing Company, Los Angeles, Calif.

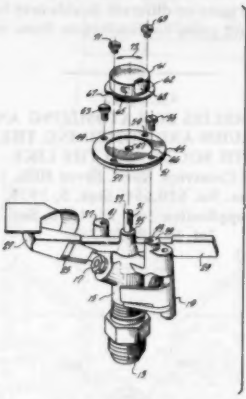
Filed Aug. 26, 1975, Ser. No. 607,891
Int. Cl.² B05B 3/14
U.S. Cl. 239—230 **9 Claims**

1. In an oscillating sprinkler including a body structure having a discharge nozzle, and an oscillating mechanism actuated by the water jet issuing from said nozzle to effect turning of said body structure, the improvement therein comprising:

first a pin fixedly located on said body structure;

a closed-end journal bearing on said oscillating mechanism for receiving said first pin, said oscillating mechanism being supported by and pivoting on said first pin a second pin fixedly located on said oscillating mechanism; and

a spring mechanism attached to said second pin and said body structure.

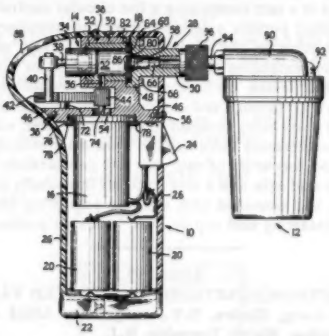


4,033,511

PORTABLE ATOMIZER APPARATUS

Edward B. Chamberlin, 112 Fifth St., Garden City, N.Y. 11530

Filed Nov. 24, 1975, Ser. No. 634,660
Int. Cl.² B05B 7/30
U.S. Cl. 239—346 **1 Claim**



1. A portable atomizer, comprising a liquid dispenser including a cap connected directly to the dispenser, the cap having an aspirator and a spray orifice communicating directly with the aspirator, the orifice being integral with the cap; a pistol grip-type handle housing a reciprocating pump for directly supplying compressed air to the aspirator through a conduit extending outwardly from the surface of the handle adjacent the dispenser and communicating between the pump and the aspirator, a check valve between the pump and the conduit for permitting compressed air to flow only from the pump to the aspirator, an electric motor for driving the pump, a rechargeable battery electrically connected to the motor for powering the motor, a charger plug electrically connected to the battery and adapted to receive a converter for recharging the battery, and a trigger switch extending outwardly from the surface of the handle adjacent the dispenser and electrically connected to the battery and the motor for controlling the operation of the motor, wherein upon operation of the motor compressed air is delivered directly to the aspirator from the pump to immediately draw liquid from the dispenser, automatically atomize liquid drawn from the dispenser and instantaneously spray atomized liquid and compressed air from the

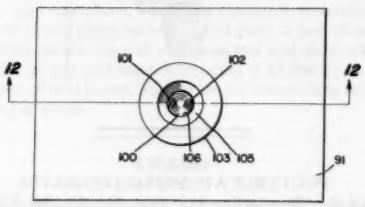
orifice; and means for releasably connecting the dispenser to the pump and for permitting the dispenser, cap and spray orifice to be replaced unitarily, whereby a plurality of dispensers containing the same or different liquids may be used interchangeably without cross-contamination from one liquid to another.

4,033,512

NOZZLE ASSEMBLIES FOR ATOMIZING AND MIXING DIFFERENT FLUIDS AND COMBINING THE MIXTURE WITH SOLIDS AND THE LIKE

Louis Beck, 6399 Crossview Road, Seven Hills, Ohio 44131

Division of Ser. No. 610,656, Sept. 5, 1975, Pat. No. 3,986,673. This application July 15, 1976, Ser. No. 705,513
Int. Cl.² B05B 7/00
U.S. Cl. 239—423 1 Claim



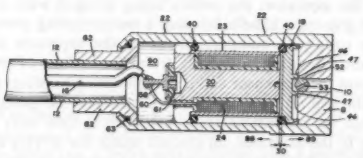
1. In a nozzle assembly of the character described, a body, a nozzle stem mounted in said body and having an axis and a plurality of passageways parallel with the axis of said nozzle and spaced equidistantly from said axis, said stem terminating at one end in a seat comprising a flat circular central portion, and a conical portion extending from the periphery of said circular portion to the external surface of said stem, said passageways extending to the conical portion of said seat, a cap or head seated on said seat, and provided with ports extending therethrough and communicating with said passageways, said ports being inclined toward each other, whereby to project fluids passing therethrough toward a common point or area spaced forwardly of said axis and substantially in alignment with said axis, and a ring or collar threadedly secured to said body and provided with a flange engageing said cap or head for retaining said cap or head in seated position.

4,033,513

ELECTROMAGNETICALLY OPERATED VALVE

E. David Long, Elmira, N.Y., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 6, 1975, Ser. No. 629,450
Int. Cl.² B05B 1/30
U.S. Cl. 239—585 19 Claims



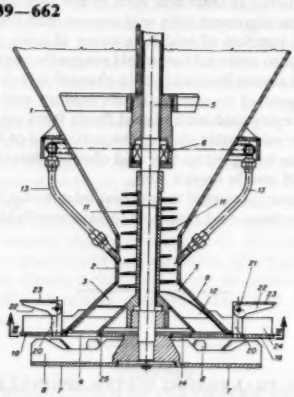
1. An electromagnetically operated valve, comprising:
a discharge means;
a sealing means for intermittently opening and closing said discharge means;
a fluid conduit for supplying fluid from a fluid inlet to said discharge means;
an electrical conductor for supplying an electrical signal to actuate said valve;
an electromagnet circuit comprising: an armature, a pole having a downstream end, a housing, a coil means for magnetizing said electromagnetic circuit in response to said electrical signal, and a flux path, said armature being a disc having a major diameter and a thickness substantially less than said major diameter, said disc having an upstream face and a downstream face and being slidably disposed at a terminal end of said housing adjacent to and between said pole and said discharge means, said armature having an upstream position, a downstream position, a travel distance between said upstream position and said downstream position, and a substantially close fitting relationship with said housing;
said armature, said pole, and said housing cooperating to define a single series air gap in said flux path between said upstream face of said armature and said downstream end of said first pole;
a travel limiter disposed coaxially around said coil for limiting travel of said armature in an upstream direction toward a downstream end of said pole, said travel limiter maintaining a residual air gap between said upstream face of said disc and said downstream end of said pole when said armature is in said upstream position, said residual air gap forming part of said single series air gap; and
a biasing means disposed within said housing for biasing said armature in its downstream position.

4,033,514

APPARATUS FOR BUILDING UP AND REPAIRING A REFRACTORY LINING

Franz Weiss, Vienna; Friedrich Baumgartner, and Werner Zach, both of Dorf-Veitsch, all of Austria, assignors to Veitscher Magnesitwerke-Actien-Gesellschaft, Vienna, Austria

Filed Nov. 10, 1975, Ser. No. 630,187
Claims priority, application Austria, Nov. 11, 1974, 8997/74
Int. Cl.² B05B 3/10
U.S. Cl. 239—662 8 Claims

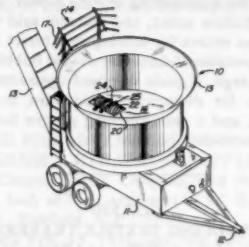


1. For use in an industrial oven or like hot-running vessel having a vertically extending refractory lining and an apparatus for building up and repairing the lining, the apparatus comprising a disc extending in a horizontal plane and rotatable in the plane for centrifugally depositing a granular refractory material on a portion of the lining to be built up or repaired, a conduit for feeding the granular refractory material to the disc, the conduit having an outlet opening above the disc, a stationary cover means over the outlet opening, the cover means having circumferentially distributed outlet ports directed towards the centrifugal disc, and plates slidable into and out of the outlet ports in a radial direction for changing the size and closing the outlet ports.

4,033,515
METHOD AND APPARATUS FOR REDUCING HAMMERMILL SLUGGING FOR LIVESTOCK FEED GRINDERS AND THE LIKE

Ernest A. Barcell, Lafayette, and James L. Pusch, Golden, both of Colo., assignors to Easy Engineering Corporation, Broomfield, Colo.

Filed July 10, 1975, Ser. No. 594,860
Int. Cl.² B02C *13/13*
U.S. Cl. 241—27 **10 Claims**



1. A method for grinding livestock feed and the like, comprising the steps of:

introducing the feed into a hollow container having an opening in the lower floor thereof for communicating with a hammermill contained within a chamber below the floor,

imparting a rotary motion to the feed along the lower floor surface so that it passes over the floor opening and drops into the hammermill,

supporting the feed over the opening in the plane of the surface of the lower floor by extending the floor surface across the opening at a plurality of narrow sections extending transversely of the opening and generally parallel to the movement of the feed in response to said rotary motion imparting step so that large clumps of the feed will not jam between the hammermill and its chamber, and

pivoting hammers of the hammermill in arcs extending above the surface of the floor for breaking up relatively dense clumps supported above the hammermill.

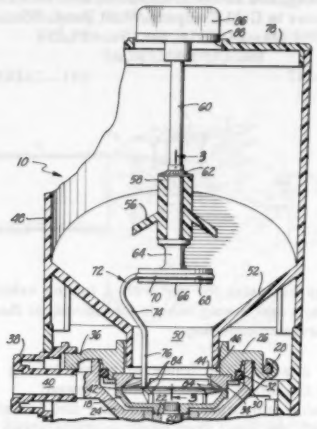
4,033,516
GRINDING APPARATUS AND METHOD

Paul M. Moskowitz, Brooklyn, N.Y., assignor to Salton, Inc., Bronx, N.Y.

Filed June 9, 1976, Ser. No. 694,176
Int. Cl.² B02C *7/11*
U.S. Cl. 241—30 **12 Claims**

11. A process of agitating a material within a hopper so as to promote the flow of said material from within said hopper through an opening in a grinding wheel to generally between said wheel and another grinding wheel as there is relative rotation occurring between said wheels in which the improvement comprises:

operating said wheels so that there is some backflow of material from generally between said wheels generally away from said wheels and toward said hopper, allowing the material caused to back-flow as a result of the operation of said wheels to hit against an agitating member movably mounted in a position in which movement of said agitating member will tend to promote flow from said hopper toward said wheel, the contact of said material causeed to back-flow because of the operation of said wheels with said agitating member causing said agitating member to move to promote the flow of material from

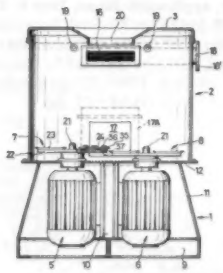


within said hopper through said opening to generally between said wheels.

4,033,517
DEVICE FOR GRANULATING THIN-WALLED PLASTIC WASTES INTO PLASTIC GRANULATED MATERIAL

Helmut Weiss, Weiherstrasse 10, 6340 Dillenburg-Manderbach, Germany

Filed July 21, 1975, Ser. No. 597,472
Claims priority, application Germany, Sept. 5, 1974, 2442497
Int. Cl.² B02C *13/06*
U.S. Cl. 241—46.11 **9 Claims**

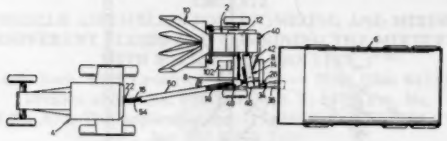


1. A device for crushing, subsequent plastification and then following agglomeration of thin-walled wastes of thermoplastic plastics having a stationary container and rotatable crushing tool means which is arranged adjacent and above the bottom wall of said container, said crushing tool means being used to produce frictional heat, comprising the improvement wherein said crushing tool means comprises at least two rotatable shafts having beaters thereon and rotatable therewith, wherein the peripheral circles described by the outer ends of said beaters are closely adjacent to effect said crushing of said wastes at a location between the place of intersection of said peripheral circles with a line joining the axes of said two rotatable shafts.

4,033,518
FORAGE HARVESTER

Phillip F. Fleming, and Steven J. Campbell, both of West Bend, Wis., assignors to Gehl Company, West Bend, Wis.

Filed May 24, 1976, Ser. No. 689,594
Int. Cl.² B02C *18/22*
U.S. Cl. 241—47 **10 Claims**



1. A forage harvester for use with a towing vehicle and connectable to a said towing vehicle for movement therewith, the forage harvester including:

a frame;

means for attaching the frame to a said towing vehicle whereby the forage harvester can be towed;

a transmission supported by the frame and including an input shaft, the input shaft being rotatable about an axis disposed at an acute angle with respect to the direction of movement of the forage harvester when viewed in plan;

a rotatable drive shaft having opposite ends, one of said opposite ends connectable to said towing vehicle and the other of the opposite ends connected to the input shaft of the transmission, the input shaft and the drive shaft being substantially co-linear when viewed in plan;

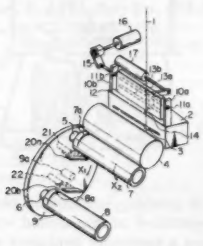
a blower supported by the frame and including a fan rotatable around a horizontal axis substantially parallel to the axis of the input shaft and the rotatable drive shaft; and

meanns for operably connecting the fan and the input shaft for rotating the fan.

4,033,519
METHOD AND APPARATUS FOR AUTOMATICALLY CHANGING BOBBINS AND WINDING YARN CONTINUOUSLY

Isamu Abe, and Takami Sugioka, both of Matsuyama, Japan, assignors to Teijin Limited and Teijin Seiki Co., Ltd., both of Osaka, Japan

Filed May 28, 1975, Ser. No. 581,590
Claims priority, application Japan, June 6, 1974, 49-63351; Nov. 26, 1974, 49-135191
Int. Cl.² B65H *54/06, 67/04*
U.S. Cl. 242—18 A **7 Claims**



1. In an apparatus for automatically changing bobbins and winding a yarn thereupon continuously which comprises a turnable turret on which a plurality of bobbin holders for holding bobbins are rotatably mounted, means for rotating bobbins held on said bobbin holders, and traverse means for traversing said yarn upstream of said bobbin holders in the axial direction thereof, means for turning said turret to alternate exchange positions of bobbins held on said bobbin holders between a winding position and a standby position, the improvement wherein said bobbin rotating means comprises a motor, a friction roller driven by said motor for driving said bobbin held on said bobbin holders when the peripheral surface of said bobbin contacts with said friction roller, a power transmission means for transmitting a driving power from said motor to said friction roller, auxiliary means for driving said bobbin for contacting said bobbin with said friction roller and comprising an arm swingably mounted on a shaft of said turret, an auxiliary roller rotatably mounted on said arm, a further motor disposed on a machine frame, and a power transmission means for transmitting driving power of said further motor to said friction roller, and wherein said turret turning means comprises means for turning said turret in a direction opposite to the rotational direction of said bobbins at the time of bobbin exchange, a guide disposed upstream of said yarn traverse means for disengaging said yarn from said yarn traverse means, and a yarn catching groove formed at a peripheral portion of each bobbin.

4,033,520
NOISE REDUCING TEXTILE TRAVERSE ROD

Herman D. Mims; John A. Willes, and Baylor D. Gibson, all of Charlotte, N.C., assignors to Celanese Corporation, Charlotte, N.C.

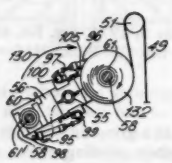
Filed July 28, 1975, Ser. No. 599,509
Int. Cl.² B65H *54/28, 57/00*
U.S. Cl. 242—43 R **8 Claims**

1. A textile traverse rod guide for a textile winder for reduced noise output comprising a unitarily fabricated traverse rod guide having cam engagement means, elongated shaft means and thread guide means, said cam engagement means connecting said thread guide means through said shaft means as a single fabricated structure, said structure being of an engineering plastic and wherein said cam engagement means and thread guide means are in fixed relationship to each other as they are joined by said shaft means, said shaft means being flexible about its axis such that when said cam engagement means and said thread guide means are twisted about said flexible shaft means, a torsional tension is created to return said cam engagement means and thread guide means to their fixed relationship.

4,033,521
WINDING MACHINES

Anthony Neiman Dee, Kenwood Lee, Sheldon Avenue, Highgate, London, England

Filed Dec. 5, 1975, Ser. No. 638,275
Claims priority, application United Kingdom, Nov. 7, 1975, 46211/75
Int. Cl.² B65H *19/26, 35/02*
U.S. Cl. 242—56 A **12 Claims**



1. A core change-over arrangement for a turret machine having a centre shaft, which arrangement comprises first and second shafts each arranged for drivingly supporting at least one core, whereby a web may be wound upon a core upon one shaft or upon a core upon the other shaft, the first and second shafts having their axes parallel to and spaced from a further parallel axis around which the pair of shafts are rotatable, a knife member carried by the centre shaft and being mounted

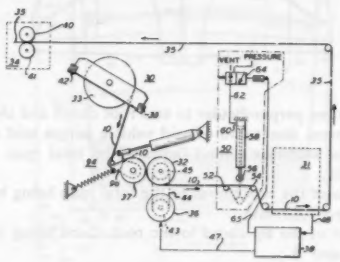
for pivotal movement about an axis located intermediate and parallel to the axes of the said first and second shafts, such that the cutter element of the knife member pivots about such axes from an inoperative position to an operative position, whereby rotation of the pair of shafts about the further axis causes the web being wound on to a core on one of the shafts to contact an empty core on the other of the shafts and whereby movement of the cutter element of the knife member into the operative position subjects the moving web to increased tension so as to sever it between the respective cores to allow further winding of the web on to the empty core.

4,033,522

MACHINE FOR ADVANCING STRIP MATERIAL THROUGH A UTILIZATION APPARATUS

W. Richard Chesnut, West Caldwell, and Daniel Calligaro, Little Falls, both of N.J., assignors to W. R. Chesnut Engineering, Inc., Fairfield, N.J.

Filed Feb. 13, 1976, Ser. No. 657,841
Int. Cl.² B65H *23/06*
U.S. Cl. 242—75.4 **19 Claims**



1. A machine for advancing strip material from a reel of the strip material through a utilization apparatus, the machine comprising:

a. support means for securing component parts of the machine in a predetermined spatial relationship;

b. reel carrier means, secured to said support means, said reel carrier means for carrying said reel of strip material and for applying a controlled drag and restoring torque to said reel of strip material;

c. metering roll means, rotatably secured to said support means so as to receive said strip material intermediate said reel of strip material and said utilization apparatus, said metering roll means for advancing said strip material;

d. spent strip material receiving means, secured to said support means so as to receive said spent strip material exiting said utilization apparatus, said spent strip material receiving means for receiving said spent strip material and for maintaining, within predetermined limits, tension of said spent strip material exiting said utilization apparatus;

e. electric motor means, secured to said support means and having a shaft which is mechanically coupled to said metering roll means, said electric motor means for causing rotation of said metering roll means; and

f. electronic control means, electrically connected to said motor means, said electronic control means for electrically energizing said motor means to cause rotation of said motor shaft through a predetermined program sequence;

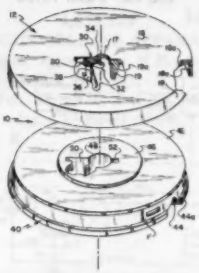
whereby strip material is advanced from said reel of strip material through said utilization apparatus in response to energization of said electric motor means, by said electronic control means, in accordance with said predetermined program sequence.

4,033,523

FILM CARTRIDGE

Robert Justin Roman, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 11, 1975, Ser. No. 639,950
Int. Cl.² G03B *23/02*
U.S. Cl. 242—198 **8 Claims**



1. A film cartridge adapted to be received by a spindle, said cartridge including film supporting means adapted to have a film strip wound thereon and a cover having a cavity defined therein to receive the film supporting means in a nested position, the cartridge further comprising:

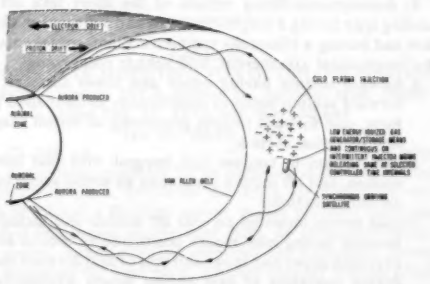
latch means including a member pivotally supported by said cover for cooperating with the spindle when the cartridge is mounted thereon, said member being movable by said spindle from (1) a first position wherein said member releasably maintains said film supporting means in said nested position toward (2) a second position wherein said film supporting means is released from said nested position.

4,033,524

METHOD AND APPARATUS FOR CONTROLLING EARTH ORBITING SATELLITES AND VEHICLES INTER ALIA

Neil M. Brice, deceased, late of King Ferry, N.Y., and by Marilyn J. Brice, executrix, R.R. No. 1, King Ferry, N.Y. 13081

Continuation-in-part of Ser. No. 164,793, July 21, 1971. This application Aug. 23, 1971, Ser. No. 174,048
Int. Cl.² B64G *1/10*
U.S. Cl. 244—158 **6 Claims**

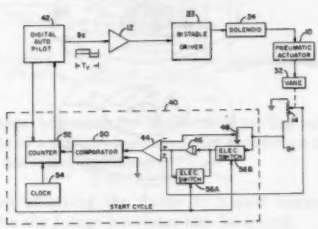


1. A method of changing the orbital parameter of an earth orbiting satellites traversing the earth's magnetosphere, which comprises the step of inducing an artificial atmospheric drag on the satellite by causing a precipitation of charged particles from the earth's radiation belt.

4,033,525
FEEDBACK PDM ENCODER AND METHOD FOR ACTUATING A PNEUMATIC ACTUATOR WITH A DIGITAL AUTOPILOT

John P. Leonard, and Robert E. Yates, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 8, 1975, Ser. No. 638,476
Int. Cl.² F42B 13/30
U.S. Cl. 244—3.15 4 Claims



1. In a guidance control system having a digital autopilot coupled to control a pneumatic PDM actuator and related missile vanes, the improvement comprising: a feedback PDM encoder; a position indicating potentiometer disposed along the vane positioning shaft of said actuator for coupling a potential change relative to said shaft position as an input to said encoder; a cycling input to said encoder from said digital autopilot for activating said encoder to receive and process input signals from said potentiometer; a digital output from said encoder to said digital autopilot for indicating the actuator position; and said feedback PDM encoder comprising an integrator having an input and an output; a comparator having an input and an output; a summing amplifier having a plurality of inputs and an output, said summing amplifier output being coupled as said comparator input, a first input of said plural inputs being coupled to said indicating potentiometer, and a second of said plural inputs being coupled to said integrator output; a counter coupled to the output of said comparator for coupling an output pulse to said digital computer; and the input of said integrator is coupled to said indicating potentiometer.

4,033,526
AERODYNAMIC FLOW BODY

William Benson, P.O. Box 5194, San Bernardino, Calif. 92408

Continuation of Ser. No. 474,938, May 31, 1974, abandoned.
This application Mar. 15, 1976, Ser. No. 667,245
Int. Cl.² B64C 15/02
U.S. Cl. 244—15 8 Claims

1. Aerodynamic-lifting vehicle of the short take off and landing type having a longitudinal axis and a maximum dimension and having a bilaterally symmetric planform taken about the longitudinal axis thereof, said vehicle comprising:

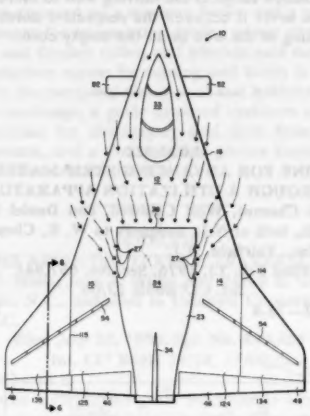
a forward section having upper and lower surfaces, said forward section being of substantially delta-shaped planform, said forward section presenting an airfoil shape in side elevation section;

an aft section in tandem and integral with said forward section, said aft section presenting an airfoil shape in side elevation section;

engine means mounted on said aft section and including a housing having inlet means positioned to induce airflow over said upper and lower surfaces of said forward section during operation of said engine means irrespective of motion of said vehicle;

a line taken along the longitudinal axis from the forward tip of said forward section to the rear tip of said aft section defining the root chord of said vehicle;

a pair of side panels, one of said side panels extending transversely from the longitudinal axis in either direction from said aft section of said vehicle, each of said side panels being of progressively increasing length, in a direction transverse to the longitudinal axis, from the forwardmost portion of said side panels aftward to at least one-half the distance of the aftmost portion of said side panels, the remainder of said side panels defining the tip chord of said vehicle, and each of said side panels presenting an airfoil shape in side elevation section;



a line taken perpendicular to said root chord and along the maximum dimension of said vehicle across said aft section of said side panels defining the total span of said vehicle;

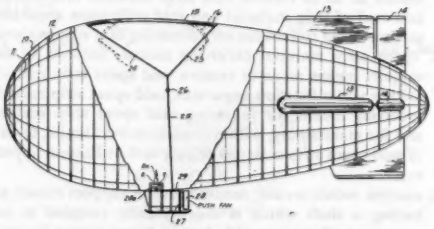
the ratio of the root chord to the total span being between 1.0 and 1.33; and

the ratio of the tip chord to the root chord being between 1/20 and ⅛.

4,033,527
DEFLATION CAP FOR PRESSURIZED HOT AIR AIRSHIP

Roger R. Parsons, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed Feb. 3, 1976, Ser. No. 654,858
Int. Cl.² B64B 1/62
U.S. Cl. 244—99 11 Claims



1. A thermal airship comprising in combination:

a horizontally elongate airship envelope of flexible material;

tail members at the aft end of said airship for guiding and directing the direction and attitude of flight;

a gondola connected to the envelope for carrying a load;

hot air generating means carried by the gondola for pressurizing the envelope during flight;

propelling means carried by the gondola for propelling said airship in flight;

means including opening edges and side edges defining a deflation opening in the airship envelope;

a cap of flexible material having end and side edges extending over the opening;

connecting means detachably connecting the cap to the opening edges so that in a deflating position the side edges of the cap remain attached to the side edges of the opening while the cap end edges are displaced from their original position;

and reinforcing means extending across the opening secured to the edges of the opening and positioned outwardly of the cap relative to the envelope interior preventing the cap from being forced outwardly by hot air within the envelope.

4,033,528

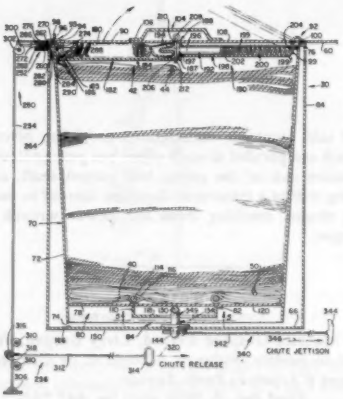
AIRCRAFT PARACHUTE SYSTEM

Richard E. Diggs, 12A Road, Carthage, Mo. 64836

Filed July 1, 1976, Ser. No. 701,630

Int. Cl.² B64D *17/00*

U.S. Cl. 244—139 **17 Claims**



1. A parachute system for stably lowering an aircraft having a fuselage, comprising:

a container receiving well defined in the fuselage;

a container for storing a main parachute, said container being portable and positionable in said receiving well prior to take-off of the aircraft and including an open top and a bottom, a keeper device attached to said bottom and having a plate thereon which is spaced from said bottom and which has an elongated slot defined therein, and a lid for covering said container top, said lid being biased open, said main parachute being connected to said container;

a drogue parachute storage means attached to said container for storing a drogue parachute in said container;

drogue parachute deploying means attached to said container lid for deploying said drogue parachute from an open container;

lid locking means on said receiving well for locking said lid over said container top to close said container, said lid locking means including means for releasably holding said lid closed;

parachute releasing means attached to said container for releasing said lid so that said lid opens to open said container, so that said drogue parachute is deployed by said drogue parachute deploying means;

said drogue parachute being connected to said main parachute, so that said deployed drogue parachute deploys said main parachute from said open container; and

container jettisoning means connecting said container to the fuselage in a releasable manner, so that said container can be released from the fuselage to detach said parachute from the aircraft, said container jettisoning means including a lug having a head engageable with said plate via said slot and a body connected to said head and depending therefrom a distance sufficient to locate a free end of said body outside said container when said head is engaged in said slot and a jettison pin removably positioned in said body outside said container for preventing said body from disengaging from said container, and pin removing means for removing said pin from said lug.

4,033,529

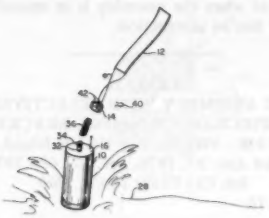
DROGUE RELEASE APPARATUS

Armand E. Bourgeois, Manchester, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Feb. 27, 1976, Ser. No. 662,196

Int. Cl.² B64D *17/38*

U.S. Cl. 244—151 B **6 Claims**



1. Apparatus for releasably coupling drogue apparatus to an article ejected into the earth's atmosphere comprising:

a release unit;

means for attaching said drogue apparatus to said release unit;

spring biasing means for projecting said release unit away from said article; and

means for locking said release unit to said article during descent and for unlocking said release unit at impact including: a member attached to and projecting above said article, said member having detent receiving means adjacent the top thereof; a detent spring located on top of said release unit and adapted to engage said detent receiving means to prevent movement of said release unit away from said article; and means at the top of said release unit which engages one end of said detent spring for maintaining said detent spring in a position other than its normal rest position and in coacting engagement with said detent receiving means when said release unit is in a predetermined assembled position and for releasing said detent spring upon translation of said release unit against said spring biasing means and away from said predetermined assembled position due to impact.

4,033,530

PROTECTIVE MOUNTING FOR OUTBOARD MOTORS

Garrett H. Harris, 157 S. Denver St., Jackson, Miss. 39209

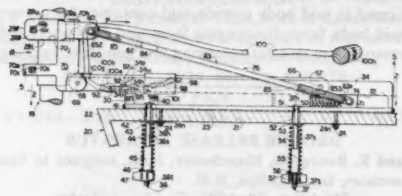
Filed Feb. 18, 1975, Ser. No. 550,666

Int. Cl.² B63H *21/26*

U.S. Cl. 248—4 **21 Claims**

1. A mounting assembly for an outboard motor which comprises a base plate, means for mounting the base plate on a deck of a boat, a first link means, means pivotally mounting the first link means on the base plate, an extendible second link means, means pivotally mounting the extendible second link means on the base plate, a motor support bracket pivotally connected to the first link means and to the second link means, resilient means urging the second link means to a normal position, the link means and the motor mounting bracket being swingable between an operative position in which the motor mounting bracket is adapted to support the motor in upright position outboard of the boat and a storage

position in which the motor mounting bracket is adapted to support the motor in substantially horizontal position overlying the deck, pivots between the motor mounting bracket and



the link means being vertically spaced when the motor mounting bracket is in operative position, the extendible link being adapted to yield when the assembly is in operative position and the motor hits an obstruction.

4,033,531

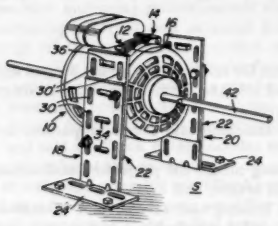
MOUNTING ASSEMBLY WITH SELECTIVELY USED ONE-PIECE OR TWO-PIECE BRACKETS

Fred Levine, 1330 - 99th St., Bay Harbor Island, Fla. 33154

Filed Apr. 27, 1976, Ser. No. 680,797

Int. Cl.² F16M *11/04, 1/00*

U.S. Cl. 248—16 **9 Claims**



1. A kit for mounting electric motors, refrigerant tanks, and the like, on a support surface, having mounting holes differing from the mounting dimensions of the article to be mounted, the kit comprising, in combination:

a. clamp means including a strap for embracing an article to be mounted; and

b. a pair of support brackets, each of the brackets having an upstanding leg portion and a base portion disposed substantially at a right angle to the leg portion and abutting a support surface, with the brackets being provided with attachment means for receiving the strap of the clamp means and supporting the article to be mounted above the support surface, the attachment means including an elongated aperture provided in the leg portion of each bracket, the aperture arranged extending perpendicular to the base portion of the bracket, and a slot arranged extending perpendicular to the aperture, with the strap of the clamp means being slidably disposed in one of the aperture and slot of each bracket.

4,033,532

POWER TOOL SUPPORT

Arne Erik Bergquist, Stockholm, and Sven Peter Jonas Westerberg, Saltsjo-Boo, both of Sweden, assignors to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Nov. 17, 1975, Ser. No. 632,305

Claims priority, application Sweden, Nov. 22, 1974, 74146804

Int. Cl.² B25B *15/00, 7/00*

U.S. Cl. 248—17 **12 Claims**

1. A reaction support for balancing the reaction torque of a power tool, said power tool having a rotating output shaft, comprising:

a stable reaction point,

a chain of a plurality of links, substantially greater than three in number, which are pivotably connected to each other, and

means for pivotally connecting said link chain to the power tool and to the reaction point with a plurality of chain links interposed between said power tool and said reaction point,

all of said pivotable connections providing pivoting axes which are parallel to each other but perpendicular to the rotation axis of the power tool output shaft, said chain being stiff in a transverse direction thereof to resist bending strains resulting from the power wrench reaction torque.

4,033,533

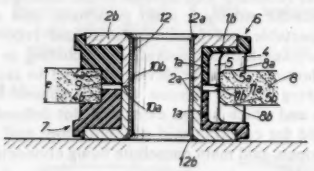
VIBRATION ABSORBER

Gérard Maurice Gaspard Evrard, Livry Gargan, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation, Paris, France

Filed Jan. 9, 1976, Ser. No. 647,792

Int. Cl.² B60G *11/18*

U.S. Cl. 248—358 R **4 Claims**



1. A vibration absorber for connecting a vibratory element to a non-vibrating element, comprising:

two resilient members each comprising a ring of elastomeric material having a smooth bore, a smooth annular outer end surface, and an annular inner end surface formed with a plurality of radially extending ribs having extreme edge level surfaces situated in a plane perpendicular to said bore, and a rigid fastening having an end flange bonded to said annular outer end surface, and a tubular portion bonded to said bore and having an inner end which projects beyond said ring of elastomeric material;

at least one of said rings comprising a hub which extends beyond said plane and has an outer peripheral surface formed with a plurality of serrations projecting thereon;

a plate shaped portion of one of said elements, having an opening formed therethrough, of a diameter substantially equal to the overall outer diameter of said serrated hub; and

brace means extending through said tubular portion of each

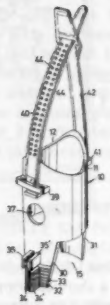
said member for pulling said fastening of each said member together whereby to draw said inner end of each said tubular portion toward each other across said opening with said serrations engaging the same, and to cause said ribs of each said member to engage both sides of said plate shaped portion, and for connecting said fastening of each said member to the other one of said elements.

4,033,534

POSITIONING DEVICE FOR TUBES TO BE EMBEDDED IN SURROUNDING CAST MATERIAL

Håkan Georg Frithiof Bergkvist, Majorsgatan 31, Varnamo, Sweden

Filed Sept. 22, 1975, Ser. No. 615,826
Claims priority, application Sweden, Sept. 24, 1974, 7411995
Int. Cl.² F16L 3/12
U.S. Cl. 248—49 5 Claims



1. A device for firmly supporting a length of tube in predetermined spaced relationship from a surface, which comprises a hollow normally vertical cylindrical body the upper end of which is arcuately shaped to provide a bed for a tube, and the lower end of which is shaped to provide members adapted to support said device on a surface and channels adapted to permit cement to flow into and fill the interior of said body when flowed thereon; circumferential, uniformly spaced guide scoring on said support members adapted to guide cuts to shorten said members by a predetermined amount; a center apertured lug on each of said support members spaced from said lower end, said lug being adapted to permit said device to be nailed or bolted to a surface, and openable locking means adapted to secure a length of tubing in said bed, a plurality of fin pairs under said lug, each fin pair extending horizontally from each score in said guide scoring, the fins of said fin pairs being spaced horizontally apart by a distance about equal to the bore of said lug, the spaces thus formed being in vertical register with the bore of said lug; said fin pairs being adapted to provide support for said device when said support members are shortened by cuts through said guide scoring.

4,033,535

STRAIN-RELIEF BUSHING

Thomas M. Moran, Cleveland, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed May 18, 1973, Ser. No. 361,737
Int. Cl.² F16L 5/00
U.S. Cl. 248—56 2 Claims

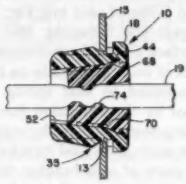
1. A one-piece, molded strain-relief bushing for holding an electric conductor fixed relative to an aperture in a support panel through which the conductor extends and adapted to be applied to and permanently locked in said aperture by means of a tool, said bushing comprising:

first and second complementary portions and a flexible web portion securing said first portion to said second portion and permitting said portions to be folded into face-to-face relationship;

each complementary portion including a grip block segment having a generally cylindrical exterior surface and a shank segment having a generally cylindrical interior surface, said grip block segment axially aligned with said shank segment and frangibly secured thereto at an end thereof;

cam means on the external surface of said shank segment to secure said shank segment within said aperture; and

locking means to permanently secure (a) said shank segments within said aperture when said bushing is inserted therein, (b) said grip block segments within said shank segments when said grip block segments are telescopically received within said shank segments, and (c) said



conductor within said grip block segments when said grip block segments are folded about said conductor and are telescopically received within said shank segments, said locking means including:

aligning means to assure a proper predetermined position of said grip block segments within said shank segments when said bushing is locked in said aperture by said tool;

said interior surface of each shank segment having an annular rib adjacent said end to which said grip block segment is frangibly secured, said interior surface further including a generally cylindrical portion tapering inwardly in a direction from said annular rib toward the end of said shank segment oppositely disposed from said grip block segment and

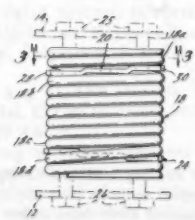
said interior surface defining a recess disposed between said annular rib and said generally cylindrical portion.

4,033,536

MOUNTING BRACKET COIL SPRING

David U. Hillstrom, Novi, Mich., assignor to Robert Sarkisian, Bloomfield Hills, Mich.

Filed Apr. 8, 1976, Ser. No. 674,873
Int. Cl.² F16M 13/00
U.S. Cl. 248—160 4 Claims



1. An improved mounting apparatus for mounting a structure to a base by an extension spring wherein the mounting surface of said structure is substantially parallel to the mounting surface of said base, comprising

a first bracket for fastening said coil spring to said mounting surface of said structure disposed between a first pair of

adjacent coils proximate to one end of said spring and secured to said spring at radially opposed points thereof by the extension force to said coils, said bracket having formed therethrough at least two radial spaced holes normal to said bracket and located proximate to the parts of said brackets disposed between said first pair of adjacent coils, siad parts of said bracket having different levels thereof such that the axes of said holes are parallel to the axis of said coil spring dispite the inclination in said first adjacent pair of coils between siad radially opposed points which said first bracket is secured to said spring;

a third part intermediate said parts of said first bracket disposed between said first pair of adjacent coils having a stepped level intermediate the levels of said aforementioned parts of said first bracket,

first fastening means adapted to fasten said first bracket to said mounting surface of said structure by thrededly engaging said holes of said bracket;

a second bracket for fastening said coil spring to said mounting surface of said base disposed between a second pair of adjacent coils proximate to the other end of said spring and secured to said spring at radially opposed points thereof by the extension force of said coils, said bracket having formed therethrough at least two radial spaced holes normal to said bracket and located proximate to the parts of said bracket disposed between said second pair of adjacent coils, said parts of said bracket having different levels thereof such that the axes of said holes are paralell to the axis of said coil spring despite the inclination in said second adjacent pair of coils between said radially opposed points at which said second bracket is secured to said spring;

a third part intermediate said parts of said first bracket disposed between said first pair of adjacent coils having a stepped level intermediate the levels of said aforementioned parts of said first bracket,

second fastening means adapted to fasten said second bracket to said mounting surface of said base by threadedly engaging said holes of said bracket.

4,033,537

KNITTING MACHINE STAND

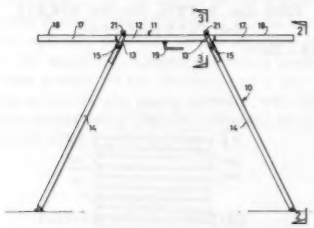
Brian Frederick Pridham, 20 Firebrace St., Horsham, Victoria, Australia (3400)

Filed July 16, 1974, Ser. No. 489,039

Claims priority, application Australia, July 18, 1973, 4128/73; Aug. 3, 1973, 4345/73

Int. Cl.² F16M *11/32*

U.S. Cl. 248—165 **5 Claims**



1. A stand for a knitting machine having a main support frame and two support sections pivotally supported on said support frame to extend away from either end of the main support frame for rotation between one operating position and a tilted operating position and adapted, in use, for supporting a knitting machine attached at either end thereof to the respective support sections, said support sections being mounted on a common support axle extending through the main support frame, clamping means supported on said main frame to engage said common support axle to releasably hold said support axle fixed with respect to said main frame at either operating position, and stop means provided on said main support frame and cooperating with said common support axle for restricting the movement of said support axle to movements between said operating positions.

4,033,538

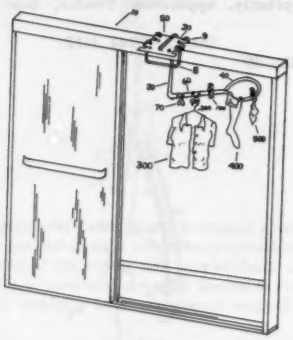
ADJUSTABLE DRIP DRY SUPPORT APPARATUS

Harold Levy, P.O. Box 600015, North Miami Beach, Fla. 33160

Continuation-in-part of Ser. No. 569,194, April 17, 1975, abandoned. This application Sept. 20, 1976, Ser. No. 724,776

Int. Cl.² E04G *3/00*

U.S. Cl. 248—214 **4 Claims**



1. An adjustable clothes drying device usuable with a bathtub enclosure having a shower door beam of square cross section, the device comprising an adjustable clamp for fitting over the door beam and a cantilever arm horizontally extending outwardly from the clamp toward the interior of the bathtub enclosure, the clamp being constructed from a rectangular plate of sheet material having a first set of holes parallel to a first edge and a second set of holes parallel to a second edge opposite said first edge, a first set of slots in said first edge corresponding in number to and adjacent said first set of holes and a second set of slots in said second edge corresponding in number to and adjacent said second set of holes, said clamp further including a pair of spaced apart U-shaped clamping members, each clamping member having one leg engaging a corresponding hole and slot of said first sets of holes and slots and the other leg engaging a corresponding hole and slot of said second sets of holes and slots, the holes and slots of said first and second sets being at least three in number, whereby the position of said clamping members may be selected in accordance with the size of said door beam such that when the rectangular plate is positioned against the top of the door beam the clamping members straddle to door beam to stabilize the drying device.

4,033,539

OPTICAL RAIL SYSTEM

Arpad Bardocz, Rumannstrasse 57, 8 Munich 23, Germany

Filed Mar. 22, 1971, Ser. No. 126,562

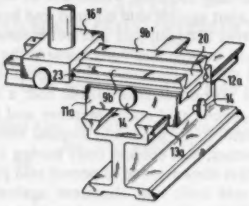
Claims priority, application Germany, Apr. 3, 1970, 2016067

Int. Cl.² F16M *13/00*

U.S. Cl. 248—228 **4 Claims**

1. An integral optical rail comprising a uniform cross-sectional shape throughout its length, two spacedapart top longitudinally extending flat bearing surfaces, a bottom longitudinally extending flat bearing surface parallel to said top surfaces, each of said top surfaces being equal in width and the overall widths of the top and bottom of the rail being equal, four flat locating surfaces on the sides of the rail, each locating surface extending towards a central plane of the rail perpen-

dicular to the hearing surfaces from a line contiguous to the edge of a said bearing surface at an angle of substantially sixy degrees to the horizontal for cooperation with corresponding surfaces in grooves of couplings and optical carriers, said grooves also having surfaces for cooperating with the bearing surfaces, a fifth and a sixth flat locating surface each extending inwardly and towards an outer edge side of the rail from a line

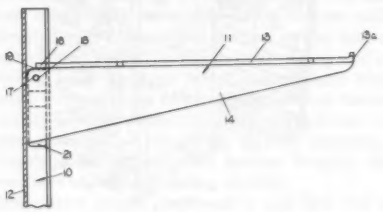


contiguous to an inner edge of a top bearing surface at an angle of substantially sixty degrees to the horizontal, plural portions of said rail cros-section in a plane parallel to the bearing surfaces narrowing to a width in the range of one third to one fourth of the width of a top bearing surface at two locations spaced from a central plane perpendicular to said bearing surfaces, and a horizontal web extending between regions contiguous to said locations.

4,033,540
SHELF SUPPORTS

Richard David Hamblin, Birmingham, England, assignor to Archibald Kenrick and Sons Limited, West Bromwich, England

Filed Apr. 21, 1975, Ser. No. 569,994
Claims priority, application United Kingdom, May 16, 1974, 21731/74
Int. Cl.² A47G *29/02*
U.S. Cl. 248—246 **3 Claims**



1. A shelf support comprising a member adapted for attachment vertically to a wall or other structure, said member including an internal channel of uniform dimensions throughout its length and an outwardly facing slot formed by a pair of opposing lips;

a bracket having a shelf-supporting portion and a generally triangular flange depending from the shelf-supporting portion, said flange including a blade portion extending into said channel through said lips;

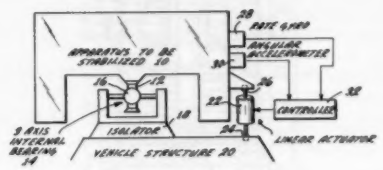
a pair of projections extending outwardly from the upper edge of said blade portion for engaging the inner surfaces of said lips; and

a pair of channel-engaging wedges pivotably supported by said blade portion and extending along the surfaces of the blade portion extending into said channel, said blade portion being frictionally inserted between said wedges and having a surface for engaging the inner rear surface of said member for rigidly supporting said bracket against movement in said channel, both by the oppositely acting purely frictional engagement between the lip-engaging projections and the channel-engaging surface of the blade portion, and the frictional engagement of said wedges with the channel by insertion of the blade portion for infinite adjustability of said bracket.

4,033,541
TORQUE REJECTION SOFT MOUNTED PLATFORM

Richard M. Malueg, Glendora, Calif., assignor to McDonnell Douglas Corporation, Long Beach, Calif.

Filed May 30, 1975, Ser. No. 582,096
Int. Cl.² F16F *15/08, 11/00*
U.S. Cl. 248—358 R **16 Claims**



1. In combination with apparatus to be stabilized against motion in a predetermined rotational direction and isolated from translational vibrations of its support, a stabilization system comprising in combination:

a. bearing means having a fixed part and a rotatable part, said rotatable part being adapted to be attached to the apparatus to permit it to rotate in the predetermined rotational direction;

b. isolation means connecting said fixed part of said bearing means to a supporting frame, said isolation means including a member relatively compliant in the direction of the translational vibrations of said support frame;

c. dynamic correcting means including an actuator, connecting the apparatus with said supporting frame in parallel with the series combination of said bearing means and said isolation means, and disposed to apply torque to said apparatus in the predetermined direction in response to applied correcting signals;

d. motion sensing means coupled to the apparatus for signaling rotation of the apparatus in the predetermined rotational direction; and

e. feedback control means connected to said motion sensing means and said dynamic correcting means for generating correcting signals to drive said dynamic correcting means in accordance with a predetermined function of said motion sensing means signal,

whereby said actuator applied restoring torques to the apparatus to oppose applied torques in the predetermined rotational direction.

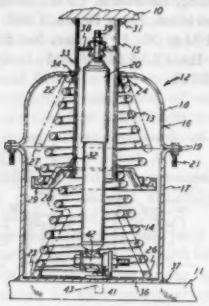
4,033,542
DUAL SPRING SUPPORT

Kenneth Albert Moehle, and Raymond George Taschner, both of Racine, Wis., assignors to J. I. Case Company, Racine, Wis.

Filed Aug. 11, 1976, Ser. No. 713,518
Int. Cl.² B62A *33/06, 39/00*
U.S. Cl. 248—358 AA **1 Claim**

1. A dual spring and shock absorber support assembly, comprising two spaced-apart members which are movable toward and away from each other, a tubular connector being affixed to one of said two members and extending toward and spaced from the other of said members, an enclosure affixed to said other of said members and extending toward and spaced from said one of said members and aligned with and surrounding and extending end of said tubular connector and having two parallel and spaced-apart abutment surfaces, an abutment piece affixed to and surrounding the extending end of said tubular connector and located within said enclosure half way between said abutment surfaces and extending paral-

lel to said abutment surfaces, and being spaced from said enclosure to be freely movable therewithin, two compression coil springs of equal strength co-axially disposed in end-to-end relation respectively between said abutment piece and said abutment surfaces and co-axial with the longitudinal axis of



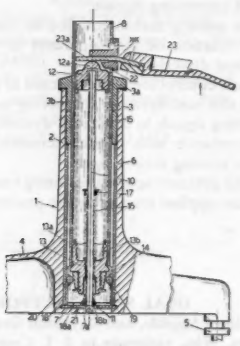
said tubular connector for dampening the movement of said members in both the toward and away directions, and a shock absorber extending in said tubular connector and co-axial with said two springs and being operatively connected at its respective ends with said two members for dampening shocks imposed upon said two members.

4,033,543

DEVICE FOR ADJUSTING THE HEIGHT OF THE SEAT OF ARM-CHAIRS AND THE LIKE

Giulio Ponzellini, Bologna, Italy, assignor to Anonima Castelli S.p.A., Bologna, Italy

Filed July 15, 1975, Ser. No. 596,017
Claims priority, application Italy, Apr. 11, 1975, 49051/75
Int. Cl.² F16M *11/00*
U.S. Cl. 248—412 **10 Claims**



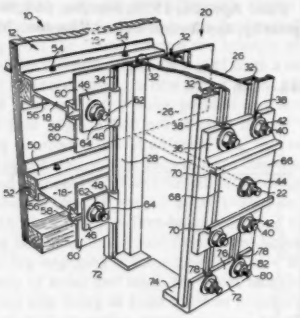
1. A device for adjusting the height of a seat of a chair or the like comprising a vertical hollow shaft fixed to the lower surface of the seat and depending therefrom; a base adapted to rest on a supporting surface and having a vertical hollow column dimensioned to telescopically receive said vertical shaft and provided on its inner surface with a bearing surface; a bushing provided at the upper end of said column dimensioned to guide said hollow shaft during its axial movements with respect to said column; a coaxial rod slidably received into said hollow shaft; control lever means movably mounted on said hollow shaft movable between operative and inoperative positions for axially displacing said coaxial rod relative to said hollow shaft; a plug member fixedly mounted on the lower end of said hollow shaft and provided with a central opening aligned with the axis of said hollow shaft and dimensioned to receive said coaxial rod therein for relative sliding movements therebetween, said plug member having a downwardly and inwardly directed tapered surface in the shape of a truncated conical body; a coaxial ball retainer means coupled to said coaxial rod and having a portion thereof disposed between said tapered surface and said bearing surface, said retainer means portion being provided with a plurality of angularly spaced radial holes; a plurality of balls each dimensioned to be partially received within one of said radial holes and adapted to abut against said tapered and bearing surfaces; a first spring acting between said retainer means and said plug member arranged to urge said balls towards the smaller diameter end of said tapered surface; a collar member mounted on an intermediate portion of said coaxial rod; a second helical spring acting between said collar member and the upper end of said plug member to urge said coaxial rod towards said control lever means, said conical body having its greatest and smallest diameters dimensioned to permit said plug member to radially move said balls into abutment against said bearing surface respectively with greater and smaller pressures when said coaxial rod and retainer means are lowered with respect to said plug member; and a third spring acting on said control lever means for urging said control level means to its inoperative position once said plug member and said hollow shaft are locked in position relative to said column.

4,033,544

WALL FORMING STRUCTURE FOR POURED CONCRETE WALLS

Ronald J. Johnston, Georgetown, Canada, assignor to Aluma Building Systems Incorporated, Downsview, Canada

Filed June 3, 1976, Ser. No. 692,598
Int. Cl.² E04G *17/06*
U.S. Cl. 249—40 **10 Claims**



1. A wall forming structure intended for use during the construction of poured concrete walls, comprising a pair of opposed panels spaced apart so as to provide a cavity into which fluid concrete is placed to form a wall; where each of said panels comprises substantially planar sheathing secured to a plurality of studs placed substantially parallel one to another, and said studs are secured to at least a pair of strongbacks placed perpendicularly to said studs, each of said panels being thereby capable of being moved as an integral unit; and where a plurality of ties extend across said cavity and through said sheathing from a strongback of one panel to a strongback of the other panel; the improvement where:

each strongback comprises a pair of channel-shaped members placed in spaced back-to-back relationship; where each channel-shaped member has a pair of side walls and a base, an outwardly facing T-shaped slot suitable for receiving the head of a bolt in each side wall near said base, and an inwardly facing flange at the end of each side wall remote from said base;

and a plurality of plates each having an opening through its thickness secured to each said pair of channel-shaped members by bolts placed in the outwardly facing T-

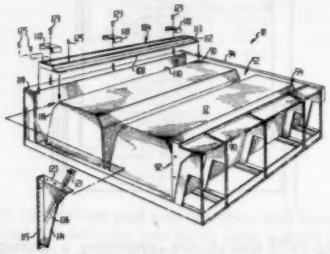
shaped slot in the side wall of each of said channel-shaped members which is remote from said sheathing, the openings in said plates being positioned between the respective channel-shaped members so that a tie may pass between the opposed bases of said pair of channel-shaped members and extend through the respective opening.

4,033,545

APPARATUS FOR MAKING INTERLOCKING CRYPT MODULES

Edward Carl Duwe, 3840 Highland Shores, and William Edward Duwe, 1203 Washington Ave., both of Oshkosh, Wis. 54901

Filed Oct. 14, 1975, Ser. No. 622,060
Int. Cl.² B28B 7/22
U.S. Cl. 249—98 **16 Claims**



1. Apparatus for casting differently configured concrete crypt modules which interlock with one another when assembled in a modular mausoleum crypt structure, comprising:

a supporting frame;

a configured unitary casting member affixed to said frame, said casting member having first and second ends and including substantially vertically oriented wall members and substantially horizontal closed bottoms extending longitudinally between said first and second ends to form open-ended, spaced casting cavities, said spaced cavities having upper openings which communicate with each other for receiving a fluent casting material therein, said casting member further including vertical end walls at said second end of said casting member extending transversely of said open-ended cavities between the wall members of adjacent casting cavities;

a first closure means positioned at said first end of said casting member for abutting against and closing the open ends of the casting cavities at said first end;

a second closure means pivotally mounted at the second end of said casting member and spaced from said end walls to provide a transverse cavity which communicates with said longitudinally extending spaced cavities; and

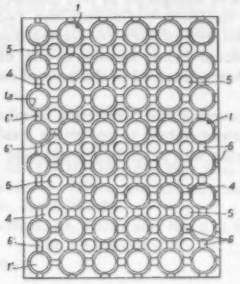
removable insert means cooperating with said casting member for altering the configuration of the module being cast, said insert means including a plurality of insert elements, a first combination of selected ones of said insert elements comprising means for forming predetermined shaped portions on a first crypt module cast from said casting material and a second combination of selected ones of said insert elements different from said first combination of insert elements comprising means for forming means for forming predetermined shaped portions on a second crypt module cast from said casting material, the predetermined shaped portions of the first crypt module having a configuration which interlocks with the predetermined shaped portions of the second crypt module when said first and second crypt modules are assembled together.

4,033,546

SHOCK ABSORBER PAD OF MOLDED FIBERS FOR THE DROP CASTING OF INGOTS

Yves Guegan, 28 Rue Guersant, Paris 17eme, France

Filed Sept. 12, 1975, Ser. No. 612,739
Claims priority, application France, Sept. 16, 1974, 74.31234
Int. Cl.² B22D 7/12
U.S. Cl. 249—174 **3 Claims**



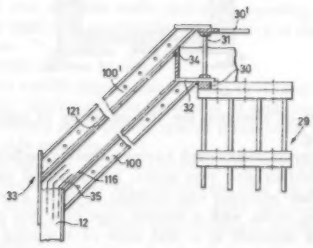
1. In combination with an ingot mold for the drop casting of ingots a shock absorber pad of molded fibers constituted by a plate of molded fibers insertable in said ingot mold, said plate comprising an assembly of cups disposed in files and rows connected by a flat thick web uniting their upper edes, said web having perforations therethrough between the edges of said cups.

4,033,547

FORM FOR POURING CONICALLY TAPERING CONCRETE STRUCTURES

Otto Heinzle, Sonderberg 19, A-6840-Gotzis (Vorarlberg), Austria

Filed Nov. 7, 1975, Ser. No. 630,036
Claims priority, application Austria, Nov. 8, 1974, 8986/74
Int. Cl.² E04G 11/04
U.S. Cl. 249—193 **7 Claims**



1. A form for pouring a concrete structure having an axis and substantially conically tapering in the direction of said axis comprising:

a. a plurality of elongated beam members obliquely inclined relative to said axis and radiating longitudinally in a direction from a common point in said axis in angularly offset relationship;

b. a plurality of connecting members, elongated in a circumferential direction and connecting each of said beam members to the two angularly adjacent beam members,

1. said connecting members being spaced from each other longitudinally of the connected beam members and sequentially increasing in length in a direction away from said axis,

2. each connecting member including two longitudinally elongated, longitudinally coextensive, transversely spaced elements and two sleeve members transversely interposed between respective pairs of longitudinally terminal end portions of said elements in fixed spatial relationship,

3. said sleeve members having each an axis and being formed with an axial bore, the axis of the bore in each sleeve member being angularly offset from the axis of the bore in the other sleeve member and from the direction of elongation of said connecting member;

c. threaded fasteners connecting the two longitudinally terminal portions of each connecting member to respective connected beam members, one of said threaded fasteners being received in the bore of each sleeve member; and

d. sheeting covering said connecting members and fastened to said beam members to constitute a substantially conically tapering wall extending about said axis in a closed loop.

4,033,548

CONCRETE SHUTTERING CONNECTING MEANS

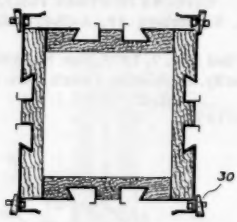
Moshe Shahar, 34 Semadar St., Ramat Gan, Israel

Filed May 12, 1975, Ser. No. 576,312

Claims priority, application Israel, Aug. 30, 1974, 45574

Int. Cl.² E04G *17/02*

U.S. Cl. 249—194 **2 Claims**



1. A set of elements for the assembly of casting molds, comprising:

a plurality of planks each having a casting surface, an opposite surface and two edges, and adapted to be joined together adjacent one another to form a portion of a casting mold, with a second edge of a first plank being joined adjacent to a first edge of a second plank; the casting surface of each of said planks being adapted to have cast thereagainst a fluent castable material for hardening thereagainst and from which said planks can be readily stripped; each of said planks being provided with two grooves on its opposite surface, each of said two grooves being located adjacent a respective one of the two edges of each plank, each of said two grooves having an undercut dove-tail side closest to the respective edge to which it is adjacent; and

means to join two said planks to one another to define a portion of a casting mold, said joining means comprising a pair of profiled rails, each of said rails having a tongue complementary in shape to the grooves in said planks, and connector means to tighten said rails together when the tongues of said rails interlock with the grooves of said planks to tightly hold said planks together.

4,033,549

VALVE SYSTEM FOR PROTECTION OF THE VALVE FROM ABRASION

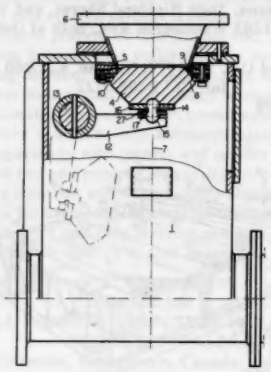
Walter Stamer, Hamburg, Germany, assignor to Claudius Peters AG, Hamburg, Germany

Filed Dec. 27, 1974, Ser. No. 536,747

Claims priority, application Germany, Dec. 28, 1973, 2364904

Int. Cl.² F16K *25/00*

U.S. Cl. 251—86 **6 Claims**



1. A flap valve type closure comprising, a housing having a vertical first axis and a top wall defining a circular material-inlet orifice symmetrical about said first axis, an annular valve seat in said housing contiguous to, below and coaxial with said orifice, said orifice having a radius less than that of said seat, a control shaft journaled in said housing for pivoting about a second axis normal to and offset from said first axis, an arm fixed at one end to said shaft and pivotable therewith from a first position wherein its distal end lies on said first axis, to a second position wherein said distal end is offset from said first axis, a flap valve carried by the distal end of said arm and having a surface formed as a portion of the surface of a sphere engageable with said seat in sealing relation therewith, said surface having a geometrical center essentially on said first axis when said arm is in its said first position, and a rod connected at its upper and lower ends to said flap valve and arm, respectively, and mounting said valve for limited universal pivoting about said geometrical center, said arm in its said second position moving said valve to position laterally offset from said first axis.

4,033,550

WATER GATE VALVE

Charles Wheatley; Ronald A. Schuller, and Al Hogan, all of Tulsa, Okla., assignors to Wheatley Company, Tulsa, Okla.

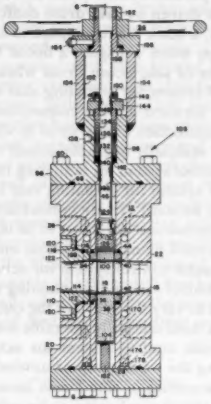
Continuation-in-part of Ser. No. 440,670, Feb. 8, 1974, abandoned, which is a continuation of Ser. No. 279,214, Aug. 9, 1972, abandoned. This application Aug. 19, 1975, Ser. No. 605,855

Int. Cl.² F16K *3/02*

U.S. Cl. 251—328 **3 Claims**

1. A gate valve comprising a housing having aligned bores providing a fluid passageway therethrough, a gate member reciprocally interposed between the aligned bores to provide alternate open and closed positions for the valve, valve seat means disposed in the aligned bores and on opposite sides of the gate member for engagement thereby, means extending into the housing and operably connected with the gate member for reciprocating thereof, said gate member being provided with a transverse aperture in alignment with the aligned bores in one position of the gate to provide said open position for the valve and out of alignment with the aligned bores in a

second position of the gate member to provide said closed position for the valve, said gate member comprising a slab-like body, said housing being of a slim overall length and having oppositely disposed substantially parallel flat faces for facilitating installation of the valve in a minimum longitudinal space, one of said flat parallel faces having a removable block means therein whereby said valve seat means may be assembled in said valve about said gate member, said block means being stepped for securing said valve seats against said gate member and simultaneous forming a part of one of said parallel flat faces, said block means sealing with said valve, shim means being used between said block means and said valve to insure a good seal between said gate means and said valve seat means.

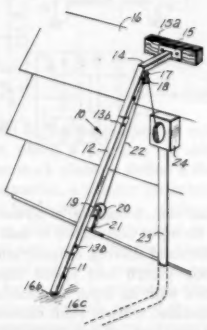


4,033,551

TOOL FOR PULLING UNDERGROUND SERVICE WIRE UP A CONDUIT

Ralph E. Lindstrom, 1915 Sylvan Way, Bremerton, Wash. 98310

Filed July 6, 1976, Ser. No. 702,437
Int. Cl.² E21C *29/16*
U.S. Cl. 254—134.3 R **1 Claim**



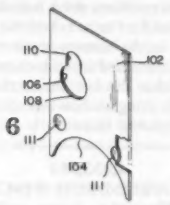
1. An underground service entrance wire puller, comprising in combination, a tube assembly comprised of a plurality of inter-telescoping tubes each of which is of rectangular cross-sectional configuration and consisting of an intermediate tube which at a lower end thereof adjustably engages a ground-abutting tube and which at its other end engages a wall-abutting tube; each said tube having a plurality of spaced apart, transverse openings extending therethrough, said openings selectively receiving pin fasteners therethrough for securing said tubes together at any desired telescoping length; said intermediate tube having a winch secured to one side thereof by means of a bracket, said winch including a handle grip for operation of said winch, a line wound on said winch; said ground abutting tube having a base on its lower end for engaging a ground, said wall-abutting tube being of angular configuration by including an obtuse angle between straight opposite end portions thereof, one of said end portions for abutting a wall including a foot secured on its end and a nonmarring block affixed adjacent an end of said foot for engaging a surface of said wall, said block being substantially longer horizontally than said foot, and a lug affixed to said wall-abutting tube in a vicinity of said angle, said lug supporting a pulley, said pulley receiving a free end of said line thereabout.

4,033,552

WINCH AND METHOD OF ASSEMBLING THE SAME

Encho Janaki Kuzarov, Milwaukie, Oreg., assignor to Warn Industries, Inc., Kent, Wash.

Filed Sept. 23, 1975, Ser. No. 615,936
Int. Cl.² B66D *3/00*
U.S. Cl. 254—166 **17 Claims**



1. A winch, comprising:
a. a drum mounted for rotation about a longitudinal axis and having a drive end and an idler end,
b. an idler end support housing for the idler end of the drum,
c. a drive end support housing for the drive end of said drum, said drive end support housing comprising:
1. a bottom section of box-like construction with integral front, rear and side walls, and a top opening,
2. a top section to enclose the top opening of the bottom section,
d. the bottom section having:
1. a main axially aligred side opening to receive in radial bearing relationship the drive end of said drum,
2. a secondary side opening spaced transversely from the main side opening,
e. an intermediate drive member positioned within the bottom section in driving engagement with the drive end of the drum, said intermediate drive member being mounted in said secondary side opening in radial bearing relationship,
f. a retaining plate positioned in the bottom section and extending vertically from said top opening in a transverse direction into said top section, said retaining plate having:
1. a downwardly facing recess having an edge portion to engage a matching annular groove in the drive end of the drum and restrain axial movement of said drum relative to the bottom section,
2. a retaining plate opening having an edge portion to engage a matching annular groove in the intermediate drive member so as to retain the intermediate drive member axially in the bottom section,
whereby the drive end of the drum and the intermediate drive member can be inserted axially into the bottom section and placed into driving engagement with each other, and the retaining plate inserted vertically through the top opening of the bottom section and into engagement with the drive end of

the drum and the intermediate drive member, and with the bottom section maintaining its integral box-like construction to withstand forces exerted thereon.

17. A method of assembling winch components, said method comprising:

a. providing a drive end support housing having a bottom section of box-like construction with integral front, rear and side walls, and a top opening, and a top section to enclose the top opening of the bottom section,

b. inserting through a main axially aligned side opening in the bottom section a drive end of a winch drum, to be received in said main side opening in radial bearing relationship,

c. inserting through a secondary side opening in the bottom section at a location spaced transversely from the main side opening an intermediate drive member to be positioned within the bottom section in radial bearing relationship in the secondary side opening, and

d. inserting a retaining plate through the top opening of the bottom section to engage with a downwardly facing recessed edge portion of the retaining plate an annular groove in the drive end of the winch drum so as to restrain axial movement of the winch drum relative to the bottom section, and also engaging with a locking slot portion of an opening in the retaining plate, a matching annular groove in the intermediate drive member when the retaining plate is lowered so as to retain the intermediate drive member axially in the bottom section,

whereby the winch drum and intermediate drive member are properly retained within the bottom section, and the bottom section maintains its integral box-like construction to withstand force loads imparted thereto.

4,033,553

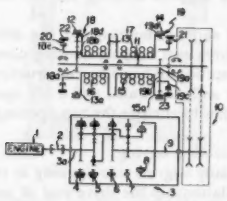
DOUBLE-DRUM WINCH

Yutaka Sugimoto, Hiratsuka, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed June 26, 1975, Ser. No. 590,569

Int. Cl.² B66D 1/26

U.S. Cl. 254—185 B **2 Claims**



1. Double-drum winch having a power source, a clutch mechanism with its input connected to said power source and comprising a forward driving connection clutch, a reverse driving connection clutch and speed changing clutches, a speed reduction means with its input connected to the output of said clutch mechanisms, a drum shaft connected to the output of said speed reduction means, a hook drum rotatably mounted on said drum shaft and adapted to wind up or unwind a hook through a hook wire wound around said hook drum and a boom drum rotatably mounted on said drum shaft and adapted to lift or descend boom means supporting said hook through a boom wire wound around said boom drum, wherein the improvement comprises a first planetary gear system mounted on said drum shaft with its sun gear secured to said drum shaft, planetary pinion gears mounted on a rotatable carrier, meshing with said sun gear and engaged with said hook drum so as to drive said hook drum through said first planetary gear system by said drum shaft, a second planetary gear system mounted on the other end of said drum shaft with its sun gear secured to said drum shaft, planetary pinion gears mounted on a rotatable carrier, meshing with said sun gear and engaged with said boom drum so as to drive said boom drum through said second planetary gear system by said drum shaft, a hook clutch arranged so as to engage and disengage said carrier of said first planetary gear system with and from a stationary portion of said winch thereby permitting said hook drum to be driven by said drum shaft when said hook clutch is engaged, a hook brake adapted to arrest the rotation of said hook drum when engaged, a boom clutch arranged so as to engage and disengage said carrier of said second planetary gear system with and from a stationary portion of said winch thereby permitting said boom drum to be driven by said drum shaft when said boom clutch is engaged, a boom brake adapted to arrest the rotation of said boom drum when engaged, a first hydraulic control system for actuating said hook clutch, said hook brake, said forward driving connection clutch and said reverse driving connection clutch so as to wind up or unwind said hook, a first manually operable means coupled with said first hydraulic control system for actuating the same, a second hydraulic control system for actuating said boom clutch, said boom brake, said forward driving connection clutch and said reverse driving connection clutch so as to lift or descend said boom means, a second manually operable means coupled with said second hydraulic control system for actuating the same, a third hydraulic control system for actuating said speed changing clutches so as to vary the speed of the output of said clutch mechanism and a third manually operable means coupled with said third hydraulic control system for actuating the same, thereby permitting the winding up or unwinding of said hook, the lifting or descending of said boom means and the speed changing of said clutch mechanism to be selectively and independently effected by the selective operation of any one or more of said first to third manually operable means.

4,033,554

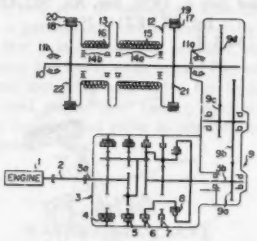
DOUBLE-DRUM WINCH

Yutaka Sugimoto, Hirakata, and Ryoji Shiota, Katano, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed June 27, 1975, Ser. No. 590,863

Int. Cl.² B66D 1/26

U.S. Cl. 254—185 B **2 Claims**



1. Double-drum winch having a power source, a clutch mechanism with its input connected to said power source and consisting of a forward driving connection clutch, a reverse driving connection clutch and speed changing clutches, a reduction gear box with its input connected to the output of said clutch mechanism, a drum shaft connected to the output of said reduction gear box, a hook drum rotatably mounted on said drum shaft and adapted to wind up or unwind a hook through hook wire wound around said hook drum and a boom drum rotatably mounted on said drum shaft and adapted to lift or descend boom means supporting said hook through a boom wire wound around said boom drum, wherein the improvement comprises a hook clutch mounted on said drum shaft for connecting and disconnecting said hook drum to and from said drum shaft, a boom clutch mounted on said drum shaft for connecting and disconnecting said boom drum to and from said drum shaft, a hook brake adapted to arrest the rotation of

said hook drum when engaged, a boom brake adapted to arrest the rotation of said boom drum when engaged, a first hydraulic control system for actuating said hook clutch, said hook brake, said forward driving connection clutch and said reverse driving connection clutch so as to wind up or unwind said hook, a first manually operable means coupled with said first hydraulic control system for actuating said first hydraulic control system, a second hydraulic control system for actuating said boom clutch, said boom brake, said forward driving connection clutch and said reverse driving connection clutch so as to lift or descend said boom means, a second manually operable means coupled with said second hydraulic control system for actuating said second hydraulic control system, said first and second hydraulic control systems causing engagement of respective hook and boom clutches when respective hook and boom brakes are disengaged, a third hydraulic control system for actuating said speed changing clutches so as to vary the speed of the output of said clutch mechanism, and a third manually operable means coupled with said third hydraulic control system for actuating said third hydraulic control system, thereby permitting the winding up or unwinding of said hook, the lifting or descending of said boom means and the speed changing of said clutch mechanism to be selectively and independently effected by the selective operation of at least one of said first, second or third manually operable means.

4,033,555

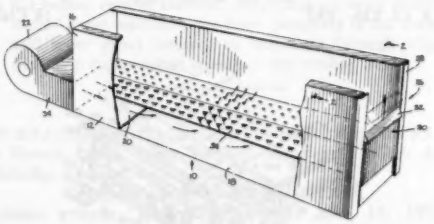
FLUIDIZED BED FOR TREATING GRANULAR MATERIAL

Leong Q. Fong, San Jose, Calif., assignor to The Motch & Merryweather Machinery Company, Hayward, Calif.

Continuation of Ser. No. 359,057, May 10, 1973, abandoned, which is a continuation of Ser. No. 105,372, Jan. 11, 1971, abandoned. This application Dec. 4, 1974, Ser. No. 529,981

Int. Cl.² B01F *15/00*

U.S. Cl. 259—4 R **21 Claims**



1. A fluidized bed for treating granular material with a gas comprising a deck plate, a plurality of side wall members extending along the deck plate to define a fluid bed chamber for receiving said material, a plenum chamber underlying said deck plate, means for supplying gas under pressure to said plenum chamber, a plurality of openings in said deck plate arranged in at least one row extending along and in spaced relation to one of said side wall members, each of said openings being formed by an incision through the deck plate with the deck plate displaced on one side of the incision to define the opening, each opening for issuing pressurized gas from the plenum in the form of a gas jet, each gas jet being formed to flow in a unitary stream with a predominant flow component along the surface of the deck plate, said plurality of openings lying in at least one row extending along and in spaced relation to a side wall member, the openings in said row being oriented to direct its gas jet toward said side wall member to induce circulation of the material from the bottom of the bed outwardly and upwardly along the said side wall and to provide substantially uniform mixing action and uniform controlled spouting.

4,033,556

END THRUST BEARING ARRANGEMENTS FOR SCREW EXTRUDERS

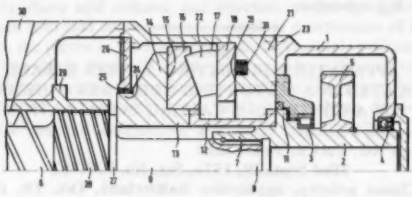
Dietmar Anders, Hannover, Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Wiese, Germany

Filed June 11, 1976, Ser. No. 695,041

Claims priority, application Germany, June 19, 1975, 2527365

Int. Cl.² B29B *1/06;* **F16C** *25/00*

U.S. Cl. 259—191 **2 Claims**



1. In an extruder having a screw driven through a reduction gearing, with a tapered roller bearing supporting said screw in an axial direction, the improvement comprising a co-rotating thrust member provided between the screw and the tapered roller bearing, an end of a shaft of said screw projecting through said thrust member and being coupled to an output shaft of said gearing to be rotated thereby and an elastically deformable sleeve surrounding said end of said shaft of said screw and coaxial therewith, one end of said elastically deformable sleeve being attached to said thrust member and the other end being attached to said output shaft of said gearing.

4,033,557

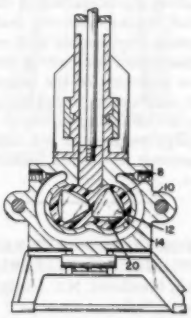
METHOD OF RECOVERY OF MATERIAL TEST SAMPLES

Heiner M. Kromer, New York, N.Y., and John Ossman, Clifton, N.J., assignors to Haake, Inc., Saddle Brook, N.J.

Filed Aug. 2, 1976, Ser. No. 710,795

Int. Cl.² B29B *1/06*

U.S. Cl. 259—192 **3 Claims**



1. A method of recovery of material test samples, comprising the steps of:

a. placement of granulated solid material within a multi-sectioned apparatus having an angulated interior surface;

b. rotatably mixing the material of said sample through the use of rotors axially disposed within the chambers of the apparatus wherein the exterior surface of said rotors exhibits an angulation which is opposite in slope to the angulation of the interior surface of mixing chambers;

c. controllably heating the material of the sample until a state of flux is obtained;

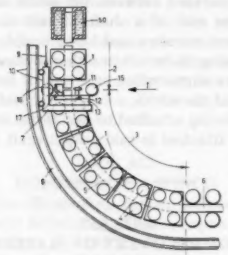
d. monitoring the viscocity of the sample in order to ascertain the point at which cross-linking is attained;
e. continuing the above steps until a hardened solid-state is reached;
f. opening of the test chamber; and
g. removing the hardened test sample which, by virtue of said opposing angulations of the test chambers and rotors, imparts to the cross-linked sample a self-releasing physical characteristic which enables it to become readily separated from the walls of the mixer and surfaces of the rotor without damage to either the sample or to the mixing apparatus.

4,033,558

APPARATUS FOR CUTTING A STEEL STRAND LOCATED IN A SUPPORTING GUIDE ARRANGEMENT OF A CONTINUOUS CASTING INSTALLATION

Friedrich Flückiger, Einsiedeln, Switzerland, assignor to Concast AG, Zurich, Switzerland

Filed Sept. 29, 1976, Ser. No. 727,762
Claims priority, application Switzerland, Oct. 10, 1975, 13220/75
Int. Cl.² B22D 11/12
U.S. Cl. 266—50 **5 Claims**



1. An apparatus for cutting a continuously cast strand, especially a steel strand, located within a support guide arrangement of a continuous casting arrangement by means of a torch cutting device, comprising a support guide arrangement incorporating strand support elements for guiding the continuously cast strand along a predetermined direction of travel, a cutting torch device, means mounting said cutting torch device to be transversely displaceable with respect to the direction of travel of the strand for cutting the strand, a change mechanism for the elements of the support guide arrangement, said change mechanism including a support member, the cutting torch device being arranged upon the support member of the change mechanism and displaceable by means of said support member to desired locations of the support guide arrangement.

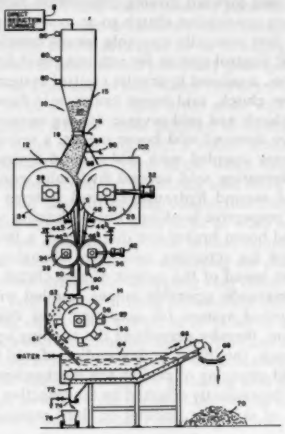
4,033,559

APPARATUS FOR CONTINUOUS PASSIVATION OF SPONGE IRON MATERIAL

Wolfgang B. Pietsch, Matthews, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Division of Ser. No. 584,184, June 5, 1975. This application Apr. 5, 1976, Ser. No. 673,787
Int. Cl.² C22B 1/26
U.S. Cl. 266—122 **15 Claims**

1. Apparatus for continuously passivating hot, reactive, particulate metal material comprising:
a. means for feeding said particulate metal material to a compacting apparatus, said feeding means including means for excluding substantially all atmospheric air therefrom;
b. means for compacting said particulate metal to form a dense elongated metal mass;
c. shearing means comprising two opposed cutting edges of metal coacting along a shear plane for simultaneously dividing said elongated metal mass substantially normal to its longitudinal dimension and densifying the newly



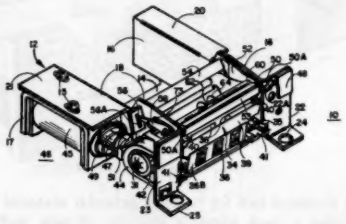
created surface by induced high shear forces, whereby a completely passivated product is produced suitable for bulk handling, storing and shipping.

4,033,560

PAPER ADVANCING MECHANISM

Frederick E. Frey, Irvine, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 6, 1975, Ser. No. 602,360
Int. Cl.² B65H 17/22
U.S. Cl. 226—157 **16 Claims**



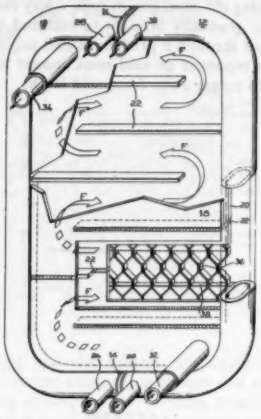
1. An apparatus for advancing a web material in incremental steps comprising:
a support structure;
roller means supported by said support structure;
web stripper means supported by said support structure and guide means forming a path for receiving said web material from said roller means and for exiting said web material;
ratchet means attached to said roller means;
driver means for selectively engaging and driving said ratchet in order to cause movement of said roller means to advance said web material when said driver means moves in a first direction;
pressure means supported by said support structure for applying pressure to said web material; and
retracting means for retracting said pressure means in response to operation of said driver means in a second direction.

4,033,561

COOLING PLATES FOR BLAST FURNACES

Patrick Dhelft, Paris, France, assignor to SOFRESID, Societe Francaise d'Etude d'Installations Siderurgiques, Montreuil, France

Filed Aug. 16, 1976, Ser. No. 714,964
Claims priority, application France, Sept. 3, 1975, 75.26978
Int. Cl.² C21B 7/10
U.S. Cl. 266—193 8 Claims



1. A cooling plate for circulating fluid for cooling the walls of shaft furnaces and particularly blast furnaces, the plate being placed between the refractory material to be cooled and the facing of the furnace to be protected, said cooling plate comprising:

a frame formed by two bent tubular elements welded at their ends to separator plates, an independent stream of cooling fluid passing through each tubular element; and

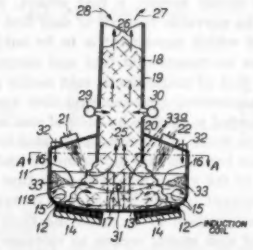
a flat hollow central element comprising an inner double-walled panel welded to the inner periphery of the frame, said inner panel forming an enclosure through which passes an independent stream of the cooling fluid.

4,033,562

FURNACE FOR MELTING SOLID FERROUS PIECES

Per Harald Collin, Falun, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed June 13, 1974, Ser. No. 479,078
Claims priority, application Sweden, June 18, 1973, 7308499
Int. Cl.² C21C 7/00
U.S. Cl. 266—216 3 Claims



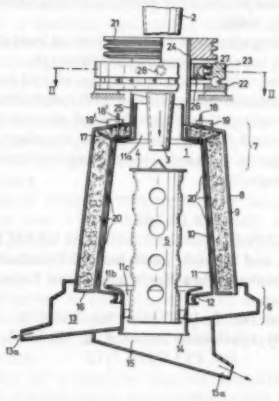
1. A furnace for melting solid pieces of metal and comprising a horizontally elongated furnace enclosure having a length-to-width ratio of at least about 4:1, said enclosure having a bottom portion forming a hearth and a roof spaced above the hearth, a vertical stack down through which the pieces of metal are charged and positioned centrally through said roof and having a bottom positioned so the charged pieces form a column down to a melt in said hearth, electric induction means below said hearth for inductively stirring the melt to form interspaced ridges in the melt's top level and a valley between the ridges with the valley below the stack spout's said bottom, burner means for directing carbonaceous fuel and oxygen flames of low oxygen potential towards said hearth and melt and forming reducing gases leaving said furnace enclosure upwardly via said stack containing the metal pieces above said column, and injection means for injecting oxygen into said stack to cause complete combustion of said gases, the pieces in the stack gradually increasingly preheating downwardly in the stack to temperatures where they are combustible in the presence of oxygen, said injection means being positioned high enough in the stack to be above the level where the pieces have preheated to said temperatures.

4,033,563

DEVICE FOR THE SEPARATION OF MIXTURES OF AT LEAST PARTIALLY MOLTEN METALS, METAL COMPOUNDS AND/OR METAL-CONTAINING SLAGS IN A CENTRIFUGAL FORCE FIELD

Willy Jakobs, and Alfred Kryczun, both of Cologne, Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Apr. 27, 1976, Ser. No. 680,673
Claims priority, application Germany, Apr. 28, 1975, 2518796
Int. Cl.² C22B 9/02
U.S. Cl. 266—204 13 Claims



1. A mechanism for the centrifugal separation of hot liquid materials such as mixtures of molten metals and slag comprising in combination:

a rotary housing for rotation about a central axis having a separation chamber therein with an inlet opening at one end for material to be separated and outlet openings at the other end for separated materials;

mounting means for supporting the housing for rotation;

an annular outer wall for said housing;

an insert sleeve concentric with and spaced inwardly from said outer wall;

an inner casing concentrically mounted within the sleeve forming said chamber;

a mounting between the outer wall and sleeve;

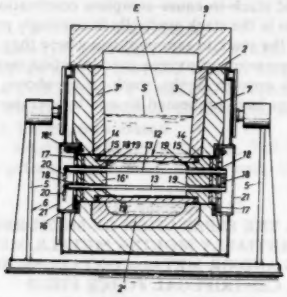
a layer of insulation between said sleeve and outer wall;

and spacers between the casing and sleeve supporting the casing concentrically therein.

4,033,564
CRUCIBLE FOR MELTING, HEAT RETENTION AND POURING OF METALS

Paul Junghanns, and Friedhelm Bürger, both of Heiligenhaus, Germany, assignors to Wilh. Engstfeld, a Kommanditgesellschaft, Heiligenhaus, Germany

Filed Feb. 5, 1976, Ser. No. 655,516
Claims priority, application Germany, Feb. 6, 1975, 2504918
Int. Cl.² F27B *14/02, 14/06*
U.S. Cl. 266—242 **12 Claims**

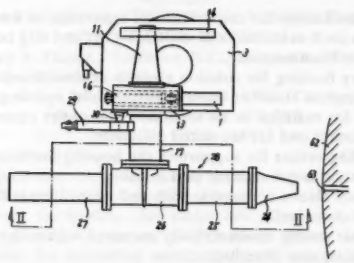


1. A crucible for melting, heat retention and pouring of metals, in particular light metal- or zinc- alloys, comprising
a crucible having crucible walls and adapted to hold a melt therein,
heat source means operatively arranged within the melt for heating the melt comprising,
a compietely peripherally closed heat source tube having ends, said heat source tube extending bridge-like between said crucible walls,
electrical heating elements entering from at least one of said ends of said tube and passing therethrough,
stoppers closing said ends, respectively, of said heat source tube, said stoppers being formed with longitudinal carrier openings passing therethrough, said electrical heating elements extend through said carrier openings,
outer flange plates outwardly supporting and covering said stoppers, respectively.

4,033,565
MUD GUN HAVING CLAMPING DEVICE

Masayuki Ueno, and Fumiaki Sano, both of Yokohama, Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Filed Jan. 3, 1977, Ser. No. 754,672
Claims priority, application Japan, Aug. 10, 1976, 51-95238
Int. Cl.² C21B *7/12*
U.S. Cl. 266—273 **4 Claims**

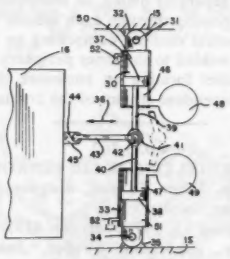


1. A mud gun having
a clamping device comprising
a. a latch which has no movable part and is anchored securely to a foundation at a position spaced apart from a shell of a furnace by a suitable distance,
b. a hook which is pivoted to a hook mount mounted on a turret of said gun and which is so actuated in response to the traverse of said turret that first a tapered portion of said hook rides on said latch whereby said hook is moved upwardly and then an engaging groove of said hook is brought into engagement with said latch,
c. spring means loaded between said hook and said latch for absorbing and storing therein the whole energy for traversing the mud gun in such a way that the mud gun may be gradually brought to rest and then it may be reversed through a predetermined angle, and
d. means mounted on said hook mount for causing said hook to rotate away from said latch.

4,033,566
PNEUMATIC LINEAR SPRING DEVICE

Niel R. Petersen, Hopkins, Minn., assignor to MTS Systems Corporation, Eden Prairie, Minn.

Filed Apr. 26, 1976, Ser. No. 680,582
Int. Cl.² F16F *7/10, 9/00*
U.S. Cl. 267—126 **6 Claims**



1. A pneumatic linear spring for use under high loads and with substantial travel comprising first and second pneumatic motor means, accumulator means to provide fluid under pressure to said motor means, a first object, a second object mounted to be movable relative to said first object in a first direction and which movement is to be subjected to spring forces, means to mount said first and second motor means relative to a first of said objects, said motor means including link means connected between said first and second motor means and loaded in tension by both of said motor means and being urged to move to a rest position, said link means having a central pivot between said motor means and being mounted with respect to the motor means and the first object to permit folding movement of said link means in said first direction from the rest position to increase the fluid pressure acting upon both of said motor means to increase tension loading from both of said motor means tending to restore the link means to said rest position, and means to couple said second object to said link means to cause said link means to move to folded position in said first direction when said second object moves in said first direction relative to the first object.

4,033,567
CUSHIONING MATERIAL CONSTRUCTION

Donald Ernest Lipfert, Woolwich, Maine, assignor to Deres Development Corporation, Greenwich, Conn.

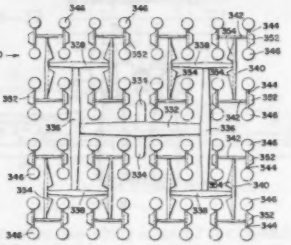
Continuation-in-part of Ser. No. 75,373, Sept. 25, 1970, Pat. No. 3,790,150. This application Apr. 2, 1973, Ser. No. 347,069

Claims priority, application United Kingdom, Oct. 4, 1969, 48860/69

The portion of the term of this patent subsequent to Feb. 5, 1991, has been disclaimed.

Int. Cl.² A47C *25/02*

U.S. Cl. 267—151 **43 Claims**



1. A cushioning material construction comprising a mechanical support system comprising at least one module comprising a plurality of displaceable bearing means, particular ones of said bearing means being interconnected to others of said bearing means by a first lever-type arrangement, so as to define a grouping of bearing means, said first lever-type arrangement being operative upon displacement of one of said load support means in a first direction to apply a force to another of said bearing means in an opposite direction, such that the displaceable bearing means will displace to conform to the shape of an imposed load and provide for distribution of load supporting forces; wherein selected groupings of interconnected bearing means are further interconnected to other groupings of interconnected bearing means by means comprising a second lever-type arrangement in combination with main support means comprising at least one module holder for holding and positioning at least one module in a selected position with relation to the main support means.

4,033,568
EDGE WORKING MACHINE WITH HOLD DOWN FOR SHEET METAL TO BE WORKED

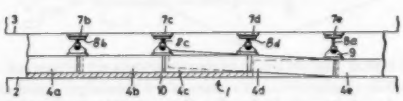
Hermann Josef Frentzen, Rheydt; Gerhard Hendrix, Stolberg; Manfred Huppertz, Monchengladbach; Hans Georg Ritter, Rheydt, and Fritz Wittek, Viersen, all of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Nov. 19, 1976, Ser. No. 743,237

Claims priority, application Germany, Dec. 5, 1975, 2555325

Int. Cl.² B23Q *3/08*

U.S. Cl. 269—26 **4 Claims**



1. In a machine for working the edges sheet metal, the improvement comprising:

a. a hold down device having a plurality of elements disposed in and along the direction of extension of the sheet metal edges to be worked, the elements being arranged in overlapping relation so that a first portion of each element at its side opposite the plate edge to be worked being disposed adjacent the preceding element, a second portion of each element at the side facing the plate edge to be worked being disposed adjacent the succeeding element;

b. a plurality of piston cylinder units, each for pressing down one of said elements against the sheet metal to be worked, the lateral surfaces of all elements facing the plate edge to be worked being in alignment with each other; and

c. means for pivotally securing the middle of each element to one of the units.

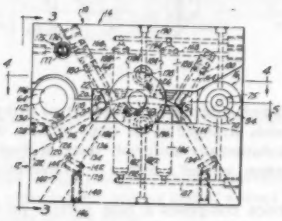
4,033,569
DEFORMATION-PREVENTING WORKPIECE-HOLDING FIXTURE FOR MACHINE TOOLS

Garf L. Dunn, 31720 Hunters Drive, Farmington Hills, Mich. 48018

Filed Oct. 15, 1976, Ser. No. 732,797

Int. Cl.² B24B *41/06*; B25B *1/20, 1/24*

U.S. Cl. 269—26 **15 Claims**



1. A deformation-preventing pressure-equalizing fixture for holding, in a machine tool during machining, a workpiece having a first end enlargement to be machined and having a thinner deformable portion adapted to be gripped by said fixture during such machining, said fixture comprising

a block structure having a cavity therein adapted to receive the thinner deformable portion of said workpiece and having an end opening adapted to expose the end enlargement of the workpiece externally of said opening for machining,

said block structure holding a base block and a cover block and a pivot element hingedly interconnecting said blocks and a locking device adapted to releasably lock said blocks together,

a plurality of longitudinally-spaced edge stops and an end stop disposed in one of said blocks and projecting into said cavity and adapted to engage an edge and an end respectively of the thinner deformable portion of said workpiece,

a plurality of workpiece support members disposed in spaced relationship to one another in said base block and projecting upward into said cavity and adapted to engage and support the bottom of the workpiece portion,

a plurality of workpiece clamping members disposed in spaced relationship to one another in said cover block and projecting downward into said cavity with their lower ends disposed substantially in alignment with the upper ends of said support members and adapted to engage the top of the thinner deformable workpiece portion and hold the same down against said workpiece support members,

means for urging said clamping members downward into such engagement with the thinner deformable workpiece portion,

lower and upper sets of lower and upper pressure-equalizing hydraulic plungers of each set disposed in longitudinally-spaced and laterally-spaced relationship and with the upper hydraulic plungers aligned with corresponding lower hydraulic plungers and adapted to engage aligned

locations on the top and bottom of the thinner deformable workpiece portion,

and a first hydraulic pressure fluid generator hydraulically connected to said pressure-equalizing plungers.

4,033,570

CORNER CLAMP

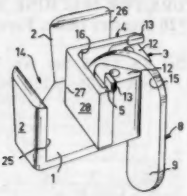
Rolf Lennart Curlow, Gustavsberg, Sweden, assignor to AB Gustavsbergs Fabriker, Gustavsberg, Sweden

Filed Apr. 8, 1976, Ser. No. 675,161

Claims priority, application Sweden, Apr. 17, 1975, 7504443

Int. Cl.² B25B *1/20*

U.S. Cl. 269—41 **5 Claims**



1. In a clamping device for such mutual fixing of constructional elements arranged at an angle to each other, each of which are substantially uniformly thick at least at the fixing area in question, so that a corner is formed between the elements.

which device comprises a base portion provided with at least two rigid, spaced abutments, a supporting means joined to the base portion, on said supporting means there being accommodated an angular pressure plate with a certain amount of freedom of movement, there also being movably attached to the supporting means a pressure-applying means by which the pressure plate can be moved towards the abutments into a clamping position in which the constructional elements inserted between the abutments and the pressure plate are cornerwise fixed adjacent each other,

the improved construction according to which the base portion comprises an abutment plate, the aforesaid abutments being formed integrally with this abutment plate and having the form of two projections extending upwardly from it and arranged at an angle to each other, the supporting means being connected to the abutment plate by means of an arm one end of which arm has a pin portion projecting from it, which pin portion is turnably mounted in a base portion of the supporting means and the other end of which arm has an engagement portion with a knurled surface structure, said knurled engagement portion extending through an aperture in a plug turnably mounted in the abutment plate, the arm being adapted to be held stationary in the aperture, when there is a certain angular displacement thereof, by engagement between the opening edges of the aperture and engagement portion of the arm.

4,033,571

POSITIONING ARRANGEMENT

Joachim Wepner, Gevelsberg, Germany, assignor to Rolf Peddinghaus, Gevelsberg, Germany

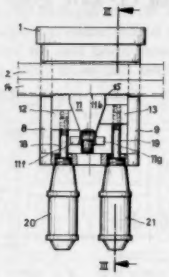
Filed Dec. 16, 1975, Ser. No. 641,187

Claims priority, application Germany, Dec. 20, 1974, 2460615

Int. Cl.² B23Q *7/00*

U.S. Cl. 269—315 **13 Claims**

1. A positioning arrangement comprising, in combination, elongated guide means extending in a first direction; an element mounted on said guide means for movement in said first direction between an infinite number of positions; means for moving said element into any selected one of said positions thereof; means for arresting said element in said selected position, including a toothed portion rigid with and extending longitudinally of said guide means, an arresting member having a detent portion juxtaposed with said toothed portion and mounted on said element for displacement relative thereto in a second direction toward and away from said toothed portion and also in said first direction, means for displacing said arresting member relative to said element at least in said second



direction into a respective one of a plurality of discrete positions of said arresting member in which said detent portion fully engages at least one of the teeth of said toothed portion, and means for locking said element with said arresting member in said selected and respective positions thereof for preventing relative movement between said element and said arresting member which is retained in said respective position thereof by the engagement of said detent portion with said toothed portion and thus arrests said element locked thereto in said selected position thereof; and means for releasing said arresting means.

4,033,572

SHEET-PLATE POSITIONING DEVICE FOR MACHINE TOOLS

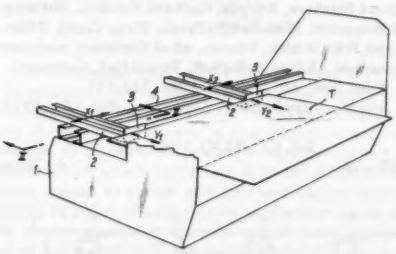
Paul Cailloux, Val de Marne, France, assignor to Promecam Sisson-Lehmann, Saint-Denis, France

Filed June 1, 1976, Ser. No. 691,408

Claims priority, application France, June 16, 1975, 75.18708

Int. Cl.² B23Q *3/00*

U.S. Cl. 269—320 **9 Claims**



1. An abutment device for the accurate positioning of a sheet-plate on the working bed of a machine tool such as a shear or bending press, which comprises a pair of parallel spaced abutment arms provided with stop members adapted to be engaged by the rear edge of the sheet-plate and movable depthwise for performing the desired adjustment, and a pair of separate carriages supporting said abutment arms and movable independently of each other on a transverse common supporting rail, wherein each carriage comprises two series of

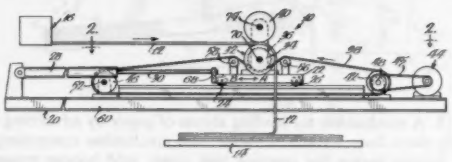
means adapted to drive the relevant carriage along said transverse rail and the corresponding abutment arm depthwise in relation to said carriage, and two series of braking means adapted to hold against motion said carriage in relation to said supporting rail and said abutment arm in relation to its carriage.

4,033,573

APPARATUS FOR CONVEYING MATERIAL AT A CONSTANT RATE TO A VARIABLE LOCATION

Harold Wortman, 5936 Monroe St., Morton Grove, Ill. 60053

Filed Sept. 29, 1975, Ser. No. 617,279
Int. Cl.² B65H *29/46*
U.S. Cl. 270—30 **8 Claims**



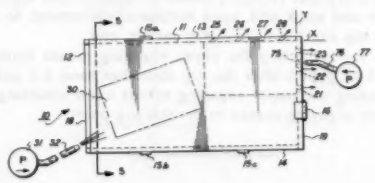
1. Apparatus for conveying material at a constant rate while supplying the material to a variable location on a material receiving means comprising: a main frame; endless driven belt means which is supported on said frame and has a predetermined speed; a carriage means which is movable on said frame; means for moving said carriage means back and forth relative to said frame; a material supply means operating at a constant speed; and a material drive means engaging said belt means, and supported for movement with said carriage to supply said material to a variable location on said material receiving means, whereby the speed of linear travel of said carriage means increases or decreases the peripheral speed of said material drive means relative to said frame to convey said material at a constant rate while supplying the material to a variable location.

4,033,574

DOCUMENT HANDLING APPARATUS

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 28, 1975, Ser. No. 635,998
Int. Cl.² B65H *29/24*
U.S. Cl. 271—3 **12 Claims**



1. Apparatus for posing documents at a station, posed documents being registered with respect to an imaginary plane and an axis perpendicular thereto, comprising

a. means for feeding documents: b. fluidic means for receiving and registering said documents at the station, the fluidic means including: a sleeve for internally accommodating said documents, at least a plurality of points on an inner narrow wall of the sleeve being located on the imaginary plane, a stop having at least one point aligned with the axis, and means, including at least one port in said stop and at least one port in said narrow wall, for providing in the sleeve a first fluid stream having velocity components normal to the imaginary plane and axis; and

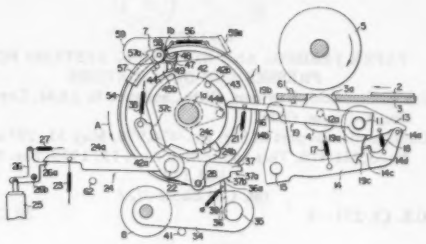
c. means for collecting discharged documents.

4,033,575

AUTOMATIC SHEET FEED AND DELIVERY APPARATUS

Sakae Fujimoto, Chofu, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 12, 1976, Ser. No. 731,423
Claims priority, application Japan, Oct. 9, 1975, 50-122309
Int. Cl.² B65H *5/12*
U.S. Cl. 271—3 **15 Claims**



1. An automatic sheet feed and delivery apparatus comprising:

a rotatable drum;

retaining claw means mounted on and rotatable with said drum for clamping the leading end of a sheet fed thereto to the surface of said drum;

retaining member means for clamping the trailing end of a sheet onto the drum, said retaining member means being rotatable with and rotatable relative to the drum along the peripheral surface thereof;

means for feeding a sheet to the drum;

means for detecting the presence of a sheet fed by the feeding means and for producing a signal indicative thereof;

a control lever means for initiating operation of said retaining claw means and said retaining member means;

means, responsive to a signal from the detecting means when a sheet is to be wrapped around the drum and also responsive to a sheet delivery signal when the sheet is to be removed from the drum, for actuating said control lever means;

cam disc means frictionally coupled for rotation with the drum and responsive to the operation of the control lever means to be prevented from rotation thereby;

means rotatable with the drum relative to the cam disc means when the latter is stopped from rotation and operable by the cam disc means for opening and then closing the retaining claw means to clamp the leading end of a sheet to the drum;

means for operating the sheet feed means as the retaining claw means, when opened by said opening and closing means, rotates together with the drum to a given position to feed the leading end of a sheet thereto;

release means for interrupting the operation of the sheet feed means after the leading end of the sheet fed onto the drum by said sheet feed means is clamped by the retaining claw means;

detent means for preventing rotation of the retaining member means with the drum just before the leading end of the sheet is clamped by the retaining claw means and while the drum is rotating through one revolution after the leading end of the sheet is clamped by the retaining claw means;

means for releasing the retaining member means from the detent means when the trailing end of the sheet has moved to a position opposite to the retaining member

means after said one revolution of the drum whereby the retaining member means clamps the trailing end of the sheet onto the surface of the drum and rotates therewith; and

delivery means responsive to said control lever means after a sheet delivery signal for delivering the sheet from the drum.

4,033,576

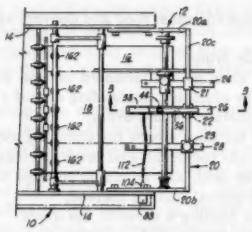
PAPER FEEDING AND RECEIVING SYSTEMS FOR PRESSES AND DUPLICATORS

Jay E. Stanfield, Guymon, Okla., assignor to J.I.M. Corporation, Guymon, Okla.

Continuation-in-part of Ser. No. 474,975, May 31, 1974, Pat. No. 3,921,970. This application Nov. 11, 1975, Ser. No. 631,139

Int. Cl.² B65H 5/22

U.S. Cl. 271—5 28 Claims



18. In a duplicating machine of the type having

a vertically reciprocable feed table,

means for picking up and feeding sheets of paper from said feed table to a printing mechanism;

means for incrementally elevating the feed table in the direction of said picking up means;

means for implacing indicia on said sheets of paper in individual sequence;

means for discharging sheets of paper in sequence after implacing the indicia thereon; and

reciprocating jogger mean adjacent said discharge means, the improvement which comprises:

a housing;

a pair of spaced belt-supporting rollers rotatably mounted in said housing;

at least one endless belt extended around said rollers and extending under said discharging means;

an oscillating needle drive structure supported in said housing and comprising:

a needle-carrying plate;

needles on said needle-carrying plate; and

guide element means secured to said housing and movably supporting said needle-carrying plate in a position adjacent said belt; and

driving means mounted in said housing and including:

a drive rod having a portion projecting from said housing in alignment with said jogger means for cooperation with said jogger means; and

linkage means interconnecting said drive rod with said needle-carrying plate for reciprocating said needle-carrying plate, said linkage means cooperating with said guide element to oscillate said plate to periodically impale said needles in said belt, and alternately, release said needles from said belt.

4,033,577

SHEET FEEDING DEVICES

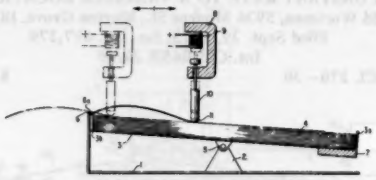
Bernard Godard, Nueville les Dieppe, and Roger Gomitoli, Arques la Bataille, both of France, assignors to La Cellophane, Paris, France

Filed Sept. 12, 1975, Ser. No. 612,758

Claims priority, application France, Sept. 18, 1974, 74.31466

Int. Cl.² B65H 1/08, 3/02

U.S. Cl. 271—128 4 Claims



1. A mechanism for feeding sheets of paper by advancing a top sheet from a stack of sheets, said mechanism comprising:

hopper means for carrying said paper, said hopper means having a closed end and an open end;

pivot means for supporting said hopper means to pivot about an axis aligned with the center of gravity of the hopper;

a load secured to the hopper on the same side of the axis as the closed end, said load creating a moment for urging said hopper to pivot in one direction about said axis;

stop means positioned adjacent the open end of said hopper means, wherein said hopper means moves relative to said stop means upon pivoting about said pivot, and wherein said stop means abuts the top sheet of paper to limit rotation of said hopper about said pivot in said one direction;

paper engaging means positioned above said hopper for engaging the top sheet of paper intermediate the ends thereof, wherein said paper engaging means is freely supported to rest on said top sheet and has a weight sufficient to effect frictional coupling between said top sheet and said paper engaging means, so that when said paper engaging means is advanced, said top sheet moves relative to the sheet upon which the top sheet rests, and wherein, the weight of the paper engaging means exerts a moment on said hopper which is opposite to, but less than, the moment created by said

means for operating said paper engaging means to cause the paper engaging means to push the top sheet of paper against said stop so as to buckle said sheet between the stop and paper engaging means to separate said top sheet from said stack and, upon further advancement, to feed said top sheet over said stop means, and

means for retracting the paper engaging means from the stack of paper, after the top sheet has been fed and for releasing the paper engaging means upon returning the paper engaging means to the starting point.

4,033,578

STACK ELEVATING APPARATUS

Thomas N. Taylor, Rochester, and Wayne F. Schoppe, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 1, 1976, Ser. No. 662,383

Int. Cl.² B65H 1/30

U.S. Cl. 271—157 24 Claims

1. A stack elevating apparatus for a sheet feeder comprising:

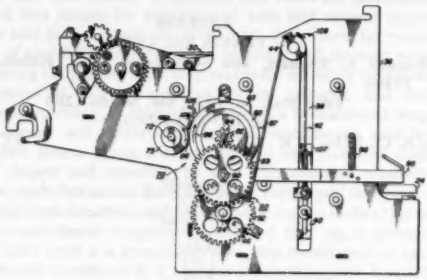
means for supporting a stack of sheets;

means for moving said stack support means between at least

one elevated position and a lowered position, said moving means including:

means for allowing said stack support means to descend by gravity to said lowered position; and friction drive means for raising said stack support means, said friction drive means comprising at least one friction roll;

means for providing an inertial force for controlling the rate of descent of said stack support means, said inertial force means including: at least one inertial member;



said inertial member comprising a wheel arranged as part of said friction drive means; means for rotating said inertial member in response to the descent of said stack support means; and means for allowing said member to continue to rotate after said stack support means has stopped at its lowered position;

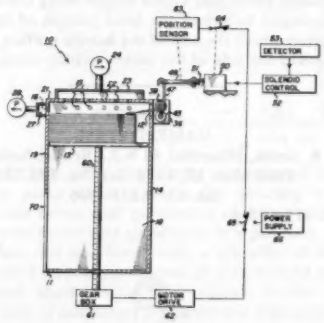
said apparatus further including means for selectively and drivingly engaging said inertial member with said friction roll.

4,033,579

OFFSET STACKER

Klaus K. Stange, Pittsford; Richard E. Smith, Webster; Thomas J. Hamlin, Macedon, and James R. Cassano, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 11, 1976, Ser. No. 665,827
Int. Cl.² B65H *31/10*
U.S. Cl. 271—195 **6 Claims**



1. Apparatus for stacking supplied sheets comprising:

a. a rectangular housing having a first wall with an orifice, a second wall opposite the first wall, a third wall orthogonally related to the second wall, and a fourth wall orthogonally related to the second wall;

b. fluidic means for selectively moving sheets fed through the orifice against the third or fourth wall of the housing and the second wall; and

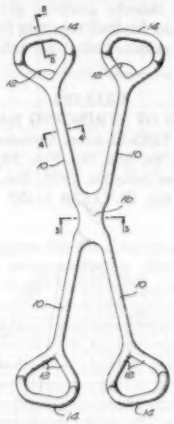
c. means for vertically supporting sheets fed through the orifice, including a platform to maintain the top-most sheet supported thereby at a predetermined location and means for moving the platform to maintain the top-most sheet on the platform at a predetermined location.

4,033,580

ELASTIC TYPE EXERCISING

Irwin S. Paris, 28 Seacove Drive, Rancho Palos Verdes, Calif. 90274

Filed Jan. 15, 1976, Ser. No. 649,372
Int. Cl.² A63B *21/02, 21/10*
U.S. Cl. 272—137 **9 Claims**



6. A resistive exercise device comprising:

a plurality of at least four resilient handle means adapted to be held by a hand or foot of the exerciser;

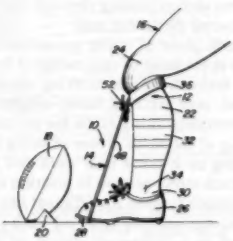
a plurality of elastic strap means joining said handles, each of said straps being integrally joined together and forming one uninterrupted structure, said strap being joined approximately midway between said handles, whereby different ones of said handles when aligned in an unstretched condition may be held alone or together to vary the resistive force produced in stretching various straps.

4,033,581

FOOTBALL KICKER'S STRAP

Jay W. Sheppard, 1426 Sandra Drive, Fort Myers, Fla. 33901

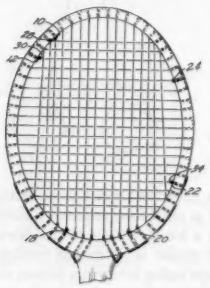
Filed Dec. 15, 1975, Ser. No. 640,930
Int. Cl.² A63B *67/00*
U.S. Cl. 273—55 B **8 Claims**



3. For use by a kicker when kicking a football placed in a generally upright, inclined position in which the toe of the kicker and football shoe must be slightly elevated for proper ball impact, a kicker's strap comprising a leg strap encircling the leg of the kicker immediately below the knee at the upper calf portion of the leg and a shoe strap connected to the leg

strap and extending diagonally downwardly and looping under the football kicking shoe adjacent to but spaced rearwardly from the toe portion thereof to enable impact of the toe portion of the shoe with the football without inteference from the shoe strap, means adjustably connecting said shoe strap to the leg strap immediately below and forwardly of the knee for maintaining the foot and leg in substantially perpendicular relation with the length of the foot and leg up to the leg strap forming elongated sides of a right triangle and the football kicker's strap defining the hypotenuse of the right triangle with the distance between the leg strap adjacent the knee and the ankle defining the longest possible lever arm acting on the torque in the ankle thereby enabling greater accuracy and distance for the kicked football resulting from transmission of leg power through a substantially rigid ankle joint to the foot.

4,033,582
METHOD OF STRINGING RACKETS
Gaylord C. Linden, 7583 El Arco, Cucamonga, Calif. 91730
Continuation of Ser. No. 446,780, Feb. 28, 1974, abandoned.
This application June 16, 1975, Ser. No. 587,141
Int. Cl.² A63B *51/00*
U.S. Cl. 273—73 D **18 Claims**



11. A method of stringing a tennis racket or the like comprising the steps of:

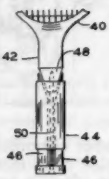
providing a racket frame having a plurality of string holes distributed in a predetermined pattern around its head, a first piece of string of suitable length to form a peripheral section of mesh within the area enclosed by said head, surrounding a central portion of that area, a second length of string of suitable length to form a working main string section consisting of a plurality of main strings passing through said central portion in the longitudinal direction and a third piece of string of suitable length to form a working cross string section consisting of a plurality of cross strings passing through said central portion in the transverse direction; and

stringing each piece of string separately through appropriate holes in the head of said racket to form the peripheral, working main string and working cross string sections of said head, said sections being adapted to cooperate to form a complete string mesh for the racket;

the stringing of the three pieces of string including the steps of securing each piece near each end in a way to firmly anchor each string section in position in the racket frame under suitable tension for efficient use of the racket, this being accomplished by tying off each piece of string near each end to a tightened strand of the string section formed from that piece of string at a point adjacent the inner periphery of said head to form a suitable knot at that point.

17. A tennis racket or the like comprising a racket frame with a head, said frame having three separate pieces of string affixed to its head under tension so as to form a peripheral section surrounding a central portion of the area within the head, a working main string section consisting of a plurality of main strings passing through said central portion in the longitudinal direction and a working cross string section consisting of a plurality of cross strings passing through said central portion in the transverse direction, the piece of string comprising each section being secured at each end by being tied off onto a strand of the section formed thereby adjacent the inner periphery of the head of said racket frame so as to maintain that section properly tensioned and positioned for use in the racket frame.

4,033,583
TENNIS RACKET
Wendell A. Ehrhart, 160 Schoolhouse Lane, Hellam, Pa. 17406
Filed Mar. 16, 1976, Ser. No. 667,286
Int. Cl.² A63B *49/08*
U.S. Cl. 273—73 R **5 Claims**



1. A racket comprising:

a. a head portion having an open frame and strings positioned within the open frame,

b. a handle portion attached to said head portion,

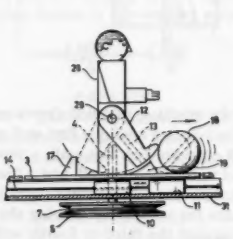
1. said handle portion being formed of two parts with a friction clutch means therebetween, said friction clutch means being adjustable to vary the frictional contact between the two parts and permitting a variable degree of rotation of one part relative the other part to absorb shock action,

2. one part of the handle portion being connected to said head portion,

3. the second part of the handle portion being adapted to be grasped by the user of the racket, and

4. said friction clutch means being between said two handle parts, said clutch means being constructed and arranged to permit the head portion of the racket to rotate about the axis of the handle portion when a ball strikes the side of the racket head.

4,033,584
GAME SYSTEM
Robert A. Smith, Maarland 58 N.Z., Brielle, Netherlands
Filed Mar. 17, 1975, Ser. No. 558,732
Int. Cl.² A63F *7/06*
U.S. Cl. 273—85 A **1 Claim**



1. In a game apparatus having a planar playing field, at least one player element; a horizontally rotatable disc member communicating with said player element; at least one pivot-

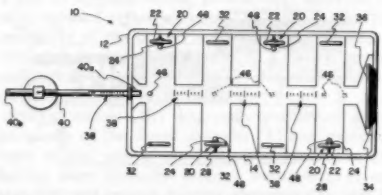
able element on said player element defining a leg; magnetic means for said leg for contributorily activating and horizontally moving said leg; first means below said disc for complimentary magnetic communication with the magnetic means of said leg; the first means below said disc being planarly slidable thereunder to selectively cause movement of said leg; second means below and communicating with the said disc for selective rotation of said disc and said player elements; first line means for engagement with said first means below said disc to move said first means in forward and rearward directions; second line means for engagement with said second means below said disc; a selectively activatable component for movement of said first and second line means; a ball element movable along the playing field; stop means for arresting backward movement of said leg defining pivotal element; said first means comprising, in tandem alignment, a forwardmost magnetic means and a rearwardmost magnetic means, said leg magentic means being attracted to said rearwardmost magnetic means and repelled by said forwardmost magnetic means, such that as said first line means moves said first means in a rearward direction, said leg magnetic means is attracted to said rearwardmost magnetic means and said leg is pivoted rearwardly until it is arrested by said stop means, and as said first means continues in a rearward direction, said forward most magnetic means repels said leg magnetic means causing said leg to forcefully pivot forwardly to simulate a kicking of said ball element.

4,033,585

AMUSEMENT GAME

Larry W. Foreman, 115 W. Burnette Ave., Enfield, N.C. 27823

Filed Oct. 8, 1975, Ser. No. 620,636
Int. Cl.² A63F *7/02, 7/10*
U.S. Cl. 273—120 R **8 Claims**



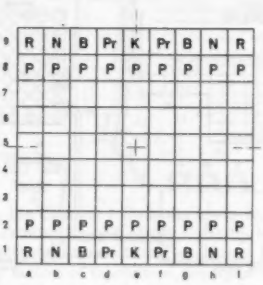
1. An amusement game comprising: a gameboard having a generally flat plane surface; means for directing a rolling target projectile across said gameboard such that said target projectile moves across said gameboard in a generally straight line path when not interfered with; a plurality of shooting stations disposed on said gameboard playing surface in longitudinal spaced apart relationship relative to the normal straight line path of said target projectile and with each shooting station spaced laterally from said normal straight line path of said target projectile, wherein during play respective players at each shooting station are provided with intercepting rolling projectiles that are propelled by the respective players across said playing board and towards the normal straight line path of said target projectile while the same moves across said playing board with the object being to hit or intercept the target projectile with the intercepting projectile whose movement across said playing board is initiated by a respective player; and retaining means formed on said gameboard about said playing surface to retain said target and intercepting projectile thereon and to prevent the same from generally rolling off said playing surface.

4,033,586

CHESS GAME APPARATUS

Michael J. Corinthios, 4031 Grey Avenue, Montreal, Quebec, Canada

Filed Aug. 13, 1975, Ser. No. 604,340
Int. Cl.² A63F *3/02*
U.S. Cl. 273—131 K **1 Claim**



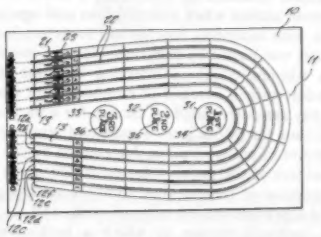
1. A chess type game for two players comprising a square board, said board being uniformly divided into eighty-one squares, each side of said board being nine squares long, and wherein the chessmen of each player consist of a king, nine pawns and eight major pieces, namely, two princes, two bishops, two knights and two rooks, each of said kings, pawns, bishops, knights and rooks having the same moves and strengths as the corresponding pieces in conventional chess, each of said princes having the same moves and strengths as the queens in conventional chess, the pieces of one player being disposed, at the beginning of each game, with the king of the player in the central square of the first row of one end of the board, the major pieces being disposed on said first row in symmetrical arrangement about said king, and the pawns being disposed in the second row at said end of said board, the pieces of the other player being disposed, in similar arrangement, at the end of the board opposing said end.

4,033,587

HORSE RACE BOARD GAME APPARATUS

Willie R. Oliver, 164 S. Portland Ave., Brooklyn, N.Y. 11217

Filed June 22, 1976, Ser. No. 698,768
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 CH **8 Claims**

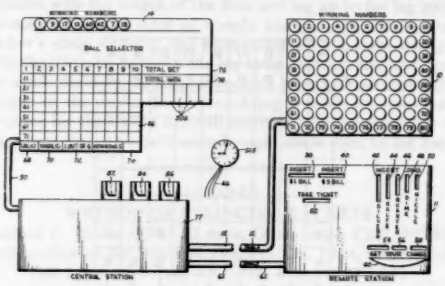


1. A game apparatus comprising in combination playing cards, scoring means and a game board, said game board having outlined thereon a horseshoe racetrack divided into a plurality of adjacent lanes, each lane being divided into a plurality of spaces and having guide means for guiding a marker along the lane, and means on which said marker is removably supported, said means comprising a marker support member coupled to said guide means and first and second pulling means coupled to said member and to each other for alternatively pulling said marker along said track in opposite directions.

4,033,588
AUTOMATIC KENO GAME

James P. Watts, 6930 E. Pinchot Ave., Scottsdale, Ariz. 85251

Filed June 16, 1975, Ser. No. 587,101
Int. Cl.² A63F 3/06; A06K 3/00
U.S. Cl. 273—138 A 6 Claims



1. In an automated Keno game system,

a. at least one remote station having a player operated console for repeated player actuation comprising,

I. means to select numbers by a player from a group of eighty on which a player wishes to bet,

II. means to indicate the amount of money to be bet on the numbers selected,

III. a device to accept money in the form of bills and change to cover the amount bet,

IV. means to return change when the amount of money deposited for acceptance is in excess of the amount of the bet,

V. a supply of tickets,

VI. mechanism to impress on a ticket the numbers selected for a bet; the amount of the bet, the date on which the bet is made and the number of the game of that date for which the bet is made on final player actuation at the console of a bet button, and

VII. means for issuing said ticket which is so impressed; and

b. a central station having an overall game operator's console connected to said remote station, including,

I. means for making a record of the numbers selected at a remote station, the amount bet on the numbers selected by the player, the date and time of selecting the numbers and the number of the ticket that is issued at said remote station,

II. a ticket validator for comparing a ticket issued at said remote station when inserted into said operator's console with recording mechanism to determine that said ticket was issued by said ticket-issuing means,

III. a winning numbers selecting machine in which a predetermined number of numbers from said group of eighty are determined by chance for a particular game;

IV. means for printing on a validated winning ticket the amount of money won as determined by the number of numbers of the group selected which come out in the operation of the winning numbers selecting machine, and a predetermined table of odds, and

V. a cashier's station at which a bettor receives the amount of money won by his play of a winning ticket for a particular game.

4,033,589
BINGO INSTRUMENT

John F. Fernandez, 2-106th Ave., Elmont, N.Y. 11003

Filed Jan. 9, 1976, Ser. No. 638,781
Int. Cl.² A63F 9/00
U.S. Cl. 273—148 R 1 Claim

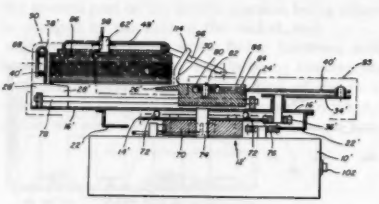
1. A bingo instrument comprising in combination a pair of levers made preferably of rigid plastic material, said levers being pivotally attached together at their intermediate longitudinal portions about a common fulcrum, one end of said levers forming handles which can be squeezed together when held in a person's hand, and the opposite end of said levers incorporating means for quickly releasing said chips thereafter, said

means comprising one of said levers having a magnet plate secured thereto and the other of said levers having a cardboard plate secured thereto, said plates being parallel and adjacent to each other when said handles are released, said handle having said cardboard plate secured thereto incorporating a hopper into which said chips drop.

4,033,590
APPARATUS FOR DISTRIBUTING PLAYING CARDS AUTOMATICALLY

Francoise Pic, Allee Beau-Rivage l-Alba, Bergerac (Dordogne), France

Continuation-in-part of Ser. No. 500,299, Aug. 26, 1974, abandoned. This application Jan. 22, 1976, Ser. No. 651,231
Int. Cl.² A63F 1/14
U.S. Cl. 273—149 R 19 Claims



1. A device for distributing playing cards comprising:

a fixed base;

a table rotatably mounted on the base;

drive means for rotating the table, said drive means being normally inoperative to drive said table;

means responsive to partial preliminary rotation of the table for switching the drive means into an operative condition to drive the table;

means for supporting a deck of cards on the table for rotation therewith;

ejection means carried by the table and operative in response to rotation of the table, said ejection means being constructed and arranged to engage the bottom card in the deck and eject the bottom card for each operation of the ejection means, the ejection means being constructed and arranged as to effect a predetermined number of complete cycles thereof for each complete rotation of the table; and

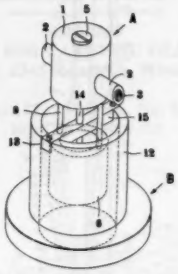
means responsive to ejection of the last card in the deck for disabling the drive means thereby automatically stopping the device.

4,033,591

PICK-UP ARM ROTARY PIVOT BEARING STRUCTURE

Yoshitomo Ichikawa, Tokyo, Japan, assignor to Ichikawa Hoseki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 28, 1976, Ser. No. 653,200
Claims priority, application Japan, Jan. 31, 1975, 50-15157[U]
Int. Cl.² G11B 3/10
U.S. Cl. 274—23 R 1 Claim



1. A rotary pivot bearing structure for a pick-up arm comprising:

a. a cylindrical base (12) with an upper portion;

b. a crosswisely extending support beam (15) extending diagonally across said upper portion;

c. an upstanding vertical pivot shaft (14) with upper and lower ends centrally secured on said support beam (15), end bearing means on said upper and lower ends;

d. substantially identical upper and lower cup-like cylinders (1, 6) each cup-like cylinder having a cup disc end closed portion, an open front end, and a cylindrical wall, said open front end of each cup being disposed astride said support beam (15) facing the front end of the other cup, said cylindrical walls being coupled to each other by stems (9);

e. upper and lower bearing elements (5, 8) threaded through the centers of said disc end portions opposed to the upper and lower ends of said vertical pivot shaft (14) and engaging the end bearing means on said upper and lower ends;

f. a pair of opposed radial, substantially identical horizontally outward extending arms (2) coupled onto the outer periphery of the cylindrical wall of the upper cylinder, each arm having a distal end with a central portion, first and second bearing elements (3) disposed on each of said distal end central portions; and,

g. bracket means (10) diagonally positioned around the periphery of the upper cylinder (1) and extending outward of said pair of arms (2), said bracket means (10) having inner threaded bearing supports (11) engaging said first and second bearing elements (3), said bracket means (10) serving to hold a cartridge mounting pick-up arm and a balance weight.

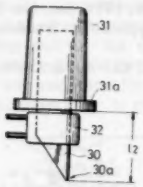
4,033,592

RECORD DISC CUTTING STYLUS

Kaoru Totuka; Isao Ohwaki, both of Tokyo; Masahiro Ohba, Yokohama, and Shinji Nakamura, Tokyo, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Oct. 30, 1975, Ser. No. 627,195
Claims priority, application Japan, Nov. 1, 1974, 49-126281
Int. Cl.² G11B 3/44
U.S. Cl. 274—38 1 Claim

1. A cutting stylus for recording multiplexed signals on a record disc, said signals comprising a direct wave signal and an angle modulated signal, said stylus comprising a cutting stylus body having a stylus tip portion for cutting a groove on the record disc and a shank holding the upper part of the stylus body, said stylus tip portion having a mirror surface at the front part thereof which faces in the direction in which cutting advances relative to the record disc, a burnishing angle in the range of approximately 25° to 40°, a relief surface in the range of approximately 30° to 40° at the rear part of said tip portion, and a burnishing facet having a width in the range approximately 0.5 μm to 3.0 μm between the mirror surface and the



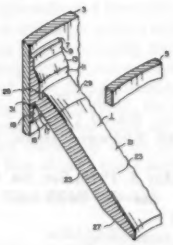
relief surface, the distance l from the lower end face of the shank to the extreme tip end of the stylus tip being within a range from approximately 2.0 mm to a lower limit which is determined by factors of fabrication, the stylus operating at a maximum signal level which decreases with a slope of −6dB/octave with increasing frequency.

4,033,593

SEAL FOR LARGE ANNULAR OPENINGS

Albert J. Molnar, Trafford; George E. Rudd, Murrysville, and Joseph F. Meier, Export, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 28, 1976, Ser. No. 700,234
Int. Cl.² F16J 15/32
U.S. Cl. 277—212 F 7 Claims



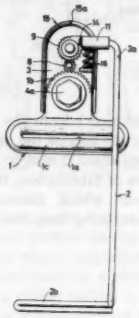
1. An annular seal for sealing a large annular space between a tubular member and a cylindrical member, said annular seal comprising an annular band forming a base, a low pressure side and a high pressure side, said base band being formed to generally engage the inner surface of the tubular member and to increase in thickness as it extends from its low pressure side toward its high pressure side, a generally frustoconical-shaped portion made integral with the base and so disposed that the apex would be on the high pressure side of the seal and an annular groove disposed on the low pressure side of the seal between said base and said frustoconical-shaped portion, whereby said annular seal will deflect easily when inserting the cylindrical member from the low pressure side and will withstand high differential pressures without blowing through.

4,033,594

DEFLECTION DEVICE FOR SAFETY BELTS FOR VEHICLES PROVIDED WITH BAND COLLECTING MEANS

Oskar Lennart Lindblad, Hedasgatan 16, 440 20 Vargarda, Sweden

Filed Jan. 8, 1976, Ser. No. 647,519
Claims priority, application Sweden, Jan. 10, 1975, 7500246
Int. Cl.² A47B 35/00
U.S. Cl. 297—389 5 Claims



1. A deflection device for a safety belt in a vehicle, comprising: support means for connection to a portion of the vehicle, deflection means pivotably mounted relative to said support means and to be engaged by the safety belt, a holder for the safety belt, and means for supporting said holder in spaced relationship to said deflection means, said holder supporting means comprising an arm, means for pivotally mounting said arm adjacent said deflection means, and means pivotally interconnecting said arm and said deflection means so that upon pivoting of said arm said deflection means pivots in the same direction as said arm.

4,033,595

HAND TRUCK

Floyd Mauch, 8245 Kirkwood Drive, Los Angeles, Calif. 90046

Filed May 5, 1976, Ser. No. 683,428
Int. Cl.² B62B 5/02
U.S. Cl. 280—5.22 10 Claims

1. A hand truck comprising:

a frame having wheels mounted on the bottom sides thereof, said frame having lower rear side support members extending angularly outwardly from the bottom thereof, each said side support members having rollers on the upper and lower ends thereof to provide a track,

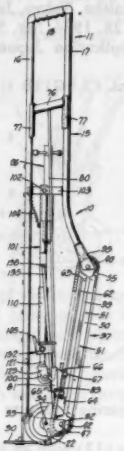
an endless belt on each of the tracks provided by said support members,

a pair of handles slidably mounted on the sides of said frame,

belt grippers on the endless belts, and

connecting means for respectively connecting said pair of slidable handles to said pair of belt grippers,

whereby when said frame is tilted about its wheels such that the rear portion of the endless belts on said support members make contact with a corner of a step and said slidable handles are pulled upwardly the belt grippers grip and pull up on the front portions of the endless belts to cause the lower rollers to operate as single movable pulleys to lift the truck up the step with a mechanical advantage of two.

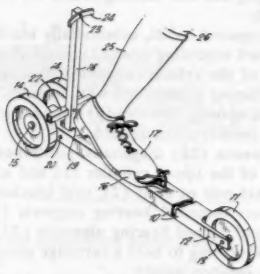


4,033,596

ROLLER SKI HAVING LEG OPERATED BRAKING MEANS

John Peter Andorsen, Dalgardstien 5, 7000 Trondheim; Helge Revhaug, Saupstadringen 43A, 7078 Saupstad, and Ole Nyberg, Osloveien 30, 7000 Trondheim, all of Norway

Filed Aug. 25, 1975, Ser. No. 607,671
Int. Cl.² A63C 17/14
U.S. Cl. 280—11.2 5 Claims



1. Roller ski which comprises a web; axles mounted in parallel on said web adjacent front and rear ends of the latter; two sets of wheels mounted for rotation each on a respective one of said axles of which at least the rearmost set has two wheels, the distance between said axles being a multiple of the diameter of the wheels; a binding for the foot of the skier mounted on said web between said sets of wheels enabling the sole of the foot to be positioned approximately at the level of said axles; a main U-shaped member comprising two arms joined by a bight at their upper ends while their lower free ends are pivotably mounted on said web permitting said member, when not in use, to be swung forwards from a substantially upstanding position in the direction of motion of said ski and downwards against said web with an arm disposed on each longitudinal side of the latter and, when in use, to be swung from said substantially upstanding position in the opposite direction as a result of the pressure exerted by the leg of the skier on being moved rearwardly into abutment with said

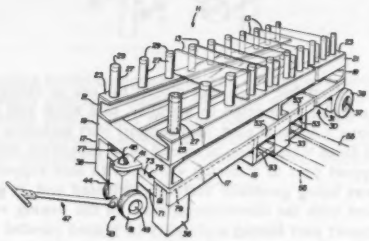
bight; and brake means comprising an auxiliary U-shaped member comprising two arms joined by a bight at their upper ends while their lower, free ends are pivotably mounted on said web adjacent said rearmost set of wheels, said member being spring-loadedly urged forwardly and away from said wheels and positioned in the rearward path of movement of the main U-shaped member so as to be abuttably swingable rearwardly thereby against the spring loading to make braking contact with said rearmost set of wheels.

4,033,597

APPARATUS FOR CARRYING GLASS PANELS

Ambroise O. Boyer, 2345 Randolph, Windsor, Ontario, Canada

Filed Dec. 22, 1975, Ser. No. 642,905
Int. Cl.² B62B *1/08*
U.S. Cl. 280—46 **7 Claims**



1. An apparatus for carrying, holding and storing glass windshields so that such windshields may be transported without damage thereto comprising:

a frame having first and second longitudinal frame members of generally the same length, said frame members being arranged parallel and in laterally spaced apart relation, said frame members having upper surfaces which are flat, with said upper surfaces of said frame members laying in a horizontal plane;

elongated pads of resilient material secured to the upper surfaces of said first and second longitudinal frame members, each pad extending the entire length of the corresponding frame member, being adapted to support first portion of a glass windshield placed thereon and prevent slippage of the windshield in either a longitudinal direction or in a lateral direction;

a first row of upright stationary dowels of generally cylindrical configuration fixedly secured to and positioned at predetermined spaced locations along the length of said first longitudinal frame member;

a second row of upright stationary dowels of generally cylindrical configuration fixedly secured to and positioned at corresponding predetermined spaced locations along the length of said second longitudinal frame member;

said dowels extending from said frame members through openings provided in said pads;

the spacing between said dowels of said first and second rows being at least sufficient to supportively receive the largest of said windshields likely to be encountered;

each of said dowels of said first and second rows being provided with a stationary elongated tubular resilient member of generally cylindrical configuration which is sleeved over the dowel, each tubular member having upper and lower annular surfaces, with the lower annular surface of each tubular member abutting one of the pads of resilient material, each of the elongated tubular resilient members being adapted to support a second portion of the windshield and prevent the scratching or breaking thereof, each tubular resilient member having a length less than the length of the corresponding dowel;

a stationary end cap of resilient material for each dowel sleeved over the upper portion thereof and having upper and lower surfaces, the lower surface of each end cap abutting the upper annular surface of the corresponding tubular resilient member, the upper surface of each resilient end cap lying in a horizontally extending plane to prevent breaking or scratching of the windshields during loading and unloading operations;

said elongated tubular resilient member and the corresponding resilient end cap for each dowel completely enclosing and covering same; and

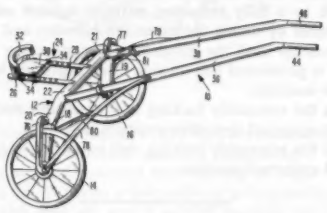
means associated with said frame for enabling the apparatus to be transported from place to place.

4,033,598

ARCH AXLE SULKY

Joseph H. King, 930 John Anderson Drive, Ormond Beach, Fla. 32074

Filed July 26, 1976, Ser. No. 708,523
Int. Cl.² B62D *27/04*
U.S. Cl. 280—63 **7 Claims**



1. A sulky for use in harness horse racing, including an arch axle frame having an elastic axis and having first and second ends, wheel means including an axle and a wheel secured to each of said first and second ends of said arch axle frame, the rotational axes of said wheel means being placed aft of the elastic axis of said arch axle frame to produce a drag-reducing castering action in said wheel means, and an adjustable seat secured to an extending aft of said arch axle frame, the improvement comprising:

a pair of spaced upwardly and forwardly extending, flexible shafts secured to said arch axle on either side of said seat, said shafts being angled inwardly toward each other and having a tear drop-shaped, streamlined cross section with one longitudinal edge being rounded and the opposite longitudinal edge being tapered, the shafts being canted so that the cross-sectional axes of said shafts diverge downwardly and outwardly at an angle parallel to the direction of air flow about a horse harnessed to said sulky.

4,033,599

FOLDABLE MUDFLAP ASSEMBLY

Anthony F. Fusco, 2248 Charlotte Ave., Concord, Calif. 94518

Filed Feb. 17, 1976, Ser. No. 658,514
Int. Cl.² B62D *25/16*
U.S. Cl. 280—154.5 R **4 Claims**

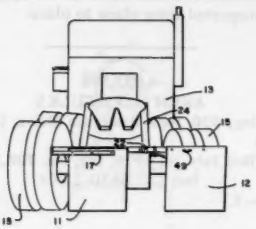
1. A foldable mudflap support assembly for retractably disposing mudflaps behind the wheels of a mudflap carrying vehicle comprising

an elongated hollow support member adapted to be attached to said vehicle between and proximate the rear portion of said wheels,

two elongated extension members each having a support end which is shaped and of a size to slide within the ends of said hollow support member, and each having means to attach a mudflap thereto such that said mudflap will hang substantially vertically therefrom,

a guide plug slidably disposed in each end of said support member,

a link member interconnecting the support end of each extension member to one of said guide plugs so as to provide a doubly pivotal interconnection therebetween whereby each of said extension members can be secured in an extended operative position by aligning the support end thereof with the guide plug and sliding the support end into the end of said hollow support member until said interconnecting link member is captured thereby, or



whereby each of the extension members can be folded back to a fully retracted position against said support member by sliding the extension member and guide plug outwardly until the pivotally interconnecting link member is positioned just outside of its capturing hollow support member,

means for releasably locking said extension members into said extended operative position, and

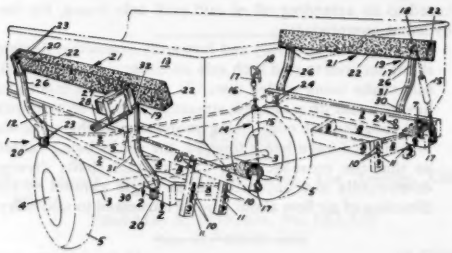
means for releasably locking said extension members into said retracted position.

4,033,600

BOAT GUIDE

Harry W. Watson, P.O. Box 9092, Shreveport, La. 71109

Filed Oct. 1, 1975, Ser. No. 618,375
Int. Cl.² B60P 3/10
U.S. Cl. 280—414 R **8 Claims**



1. A boat guide for boat trailers comprising:

a. An essentially horizontally disposed guide means; and

b. A pair of essentially vertically disposed, downwardly extending legs attached to said guide means at one end of each of said legs, and each of said legs having a first bend proximate said one end of said legs in a direction away from a vertical plane through the longitudinal center of said guide means; a second bend proximate the opposite end of said legs from said one end, for forming an end portion of said legs substantially parallel to said vertical plane; and a third bend between said first bend and said second bend in a direction toward said vertical plane to conform to the shape of the bottom and side portions of a boat; and

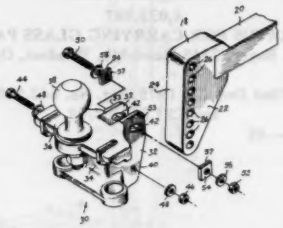
c. Means for securing said one end of each of said legs to said guide means.

4,033,601

ADJUSTABLE HITCH BALL MOUNT FOR A TRAILER HITCH

Robert F. Lindahl, and Donald F. Morgan, both of Elkhart, Ind., assignors to Masco Corporation of Indiana, Elkhart, Ind.

Filed Jan. 19, 1976, Ser. No. 650,566
Int. Cl.² B60D 1/06
U.S. Cl. 280—490 R **5 Claims**



1. An adjustable hitch ball mount for use in conjunction with a coupler connected to a trailer, said hitch ball mount comprising a support part, said support part including opposite side faces terminating in an end edge, means for attaching said support part to a towing vehicle with said support part side faces being generally vertically oriented and in general alignment with the direction of travel of the towing vehicle, said support part having a plurality of spaced parallel generally vertically aligned openings extending therethrough from one said side face to the other, a bracket including a hitch ball and a U-shaped channel part defined by spaced flanges, a first pair of aligned openings in said flanges, a second pair of aligned openings in said flanges, each second pair opening being elongated with opposite ends and located spacedly from a said first pair opening, said bracket fitted over said support part end edge and having each flange thereof overlying a side face of the support part, said first and second pairs of openings being aligned with a pair of said openings in the support part, a first bolt member extending through one of said support part pair of openings and said first pair of bracket openings, a second bolt member extending through the order of said support part pair of openings and said second pair of bracket openings, said bolt members fitting complementally within said support part pair of openings, said first bolt member constituting pivot means about which said bracket may shift relative to the support part, said second bolt member being shiftable laterally between the ends of said second pair of bracket openings to pivot said bracket about said first bolt member and to vary the angular relationship of said bracket relative to said support part whereby said hitch ball is shiftable between multiple positions, and means carried by said second bolt member and compressed against said bracket for securing said bracket in a selected angular position.

4,033,602

SKI BRAKE

Robert Spieldiener; Reinhold Spieldiener, both of Zurich, and Alphons Saiko, Oberrieden, all of Switzerland, assignors to Intamin AG, Zurich, Switzerland

Filed May 24, 1976, Ser. No. 689,346
Claims priority, application Austria, May 22, 1975, 3879/75
Int. Cl.² A63C 7/10
U.S. Cl. 280—605 **5 Claims**

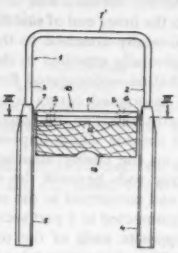
1. A ski brake for a ski comprising:

a stirrup adapted to straddle the ski and having a bight extending across the width of the ski and a pair of shanks displaceable from an inoperative position wherein said bight is held against the surface of said ski and said shanks extend generally along the longitudinal edges thereof,

into an operative position wherein said shanks extend transversely to said ski;

respective brake elements on said shanks and extending therealong engageable with the snow in said operative position of said stirrup to brake free flight of the ski;

a pair of torsion rods each secured at one end to a respective one of said shanks with a coil surrounding same; and



mounting means comprising at least one plate receiving said torsion rods and retaining the other end of each of said torsion rods against rotation, said torsion rods forming the sole pivots enabling displacement of said stirrup from said inoperative position to said operative position.

4,033,603

SAFETY SKI BINDING

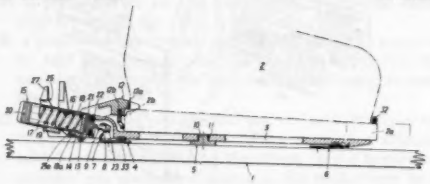
Hans Horn, Bern, Switzerland, assignor to Gertsch AG, Baar, Zug, Switzerland

Filed July 16, 1975, Ser. No. 596,265

Claims priority, application Austria, July 26, 1974, 66182/74; Oct. 30, 1974, 8711/74

Int. Cl.² A63C 9/08

U.S. Cl. 280—618 **13 Claims**



1. A releasable binding for a ski boot, comprising:

a sole plate;

means centrally located relative to said sole plate for pivotally securing said sole plate to a ski;

spaced holder means for releasably holding said ski boot onto said sole plate;

resilient means adjacent one end of said sole plate for resiliently maintaining the longitudinal axis of said sole plate in alignment with the longitudinal axis of said ski and for permitting a pivotal movement of said sole plate relative to said ski between predefined limits without effecting a release of said ski boot from the holding engagement by said spaced holder means, said resilient means including a holding element secured to said ski, a locking element mounted on said sole plate and a spring for urging said locking element into engagement with said holding element and permitting said relative pivotal movement between said sole plate and said ski against the urging of said spring; and

support means adjacent the other end of said sole plate for supporting said sole plate on said ski throughout the range of pivotal movement of said sole plate, said resilient means and said support means maintaining said pivotal securement of said sole plate to said ski throughout positions of pivotal movement thereof, said spaced holder means including release means responsive to a relative pivotal movement between said sole plate and said ski which exceeds said predefined limits for releasing said ski boot therefrom, said spring effecting a return of said sole plate to an aligned position on said ski immediately following said release of said ski boot.

4,033,604

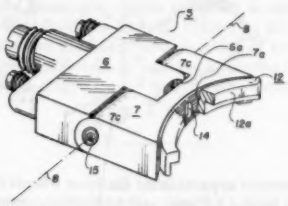
RELEASE ASSEMBLY FOR SKI BINDING

John F. Cirino, 40 Allen Farm Lane, Concord, Mass. 01742

Filed Aug. 21, 1975, Ser. No. 606,665

Int. Cl.² A63C 9/08

U.S. Cl. 280—628 **13 Claims**



1. In ski binding apparatus of the type for releasably securing a boot and ski, a release assembly comprising:

a. a main housing mounted with said ski to rotate about a vertical axis between a first position in longitudinal alignment with said ski and a second position out of such longitudinal alignment, said main housing being pivotally coupled to vertically extending shaft means rigidly secured to said ski,

b. clamp support body means mounted with said main housing to respectively pivot about a horizontal axis toward and away from clamping engagement with said boot,

c. first means for applying a controlled amount of pressure to said main housing to determine the ease by which said main housing can rotate between said first and second position, said first means comprising pressure plate means resiliently urged against said shaft means and first adjustment means for adjusting the extent of resilient pressure of said pressure plate means against said shaft means,

d. second means for applying a controlled amount of pressure against said clamp support body means, thereby to determine the ease by which said clamp support body means can pivot toward and away from said clamping engagement, said second means comprising pressure cylinder means resiliently urged against said clamp support body means at the locus of pivotal intersection of said support body and said main housing, and second adjustment means for adjusting the extent of resilient pressure by which said pressure cylinder means is urged against said clamp support body, and

e. clamp means secured to said clamp support body for engaging said boot,

f. said main housing including a pair of channels longitudinally extending between opposed end walls of said main housing and terminating in enlarged openings at said locus of pivotal intersection,

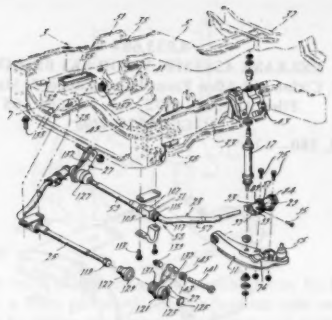
g. said second means comprising a pair of cylindrical rollers respectively disposed within said enlarged openings, a pair of springs respectively disposed within said channels for urging said rollers into engagement with said clamp support body, and adjustment screws threadably received within said channels at one of said opposed end walls for determining the extent said springs urge said rollers against said clamp support body.

4,033,605

INTEGRAL TORSION BAR — STRUT FRONT SUSPENSION SYSTEM

Robert H. Smith, Rochester, and Howard L. Benford, Bloomfield Hills, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 7, 1975, Ser. No. 630,130
Int. Cl.² B60G 11/18
U.S. Cl. 280—664 19 Claims



19. Suspension apparatus for the front wheels of an automotive vehicle having a frame, said apparatus comprising control arm means for supporting the wheels at opposite sides of said frame, and spring members connected at one end to said control arm means and at the other end to said frame, said spring members extending across said vehicle and adapted to be torsionally deflected upon movement of said wheels in a generally vertical direction, each of said spring members comprising a generally L-shaped arm having one of the portions thereof extending from an elbow rearwardly toward said control arm means, and the other portion thereof extending from said elbow across said vehicle, each of said portions becoming progressively smaller from said elbow to the end thereof and adjustable means connecting the end of said other portion of each of said spring members to said frame at the side thereof opposite the control arm means to which said one portion of the respective spring member is connected said adjustable means being adapted to rotate the ends of the spring members to which they are attached for adjusting the height of the frame relative to the surface on which the vehicle is located.

4,033,606

VEHICLE TANDEM SUSPENSIONS

James C. Ward, Springfield, and Robert Wayne Davis, Ozark, both of Mo., assignors to Reyco Industries, Inc., Springfield, Mo.

Filed Aug. 6, 1975, Ser. No. 602,218
Int. Cl.² B60G 11/10
U.S. Cl. 280—682 11 Claims

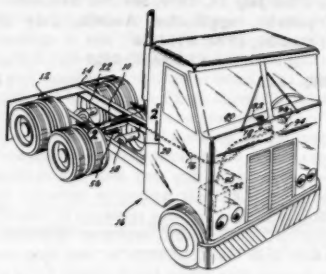
1. In a suspension for a vehicle having forward and rearward axles in tandem relation beneath the frame thereof, first and second elongated semi-elliptic compound leaf springs mounted in tandem one behind the other on each side of the vehicle and independent of one another, means coupling the medial portions of each of the said springs to the axles so that the springs at each side of the vehicle have inner ends disposed adjacent to one another and outer ends spaced remotely from one another; means slidably supporting the outer ends of the respective springs on the frame of the vehicle to react against the frame of the vehicle in the event a corresponding spring is flexed upwardly by an upwardly applied force encountered by the corresponding axle; an equalizer support member secured to the frame of the vehicle between the adjacent ends of the first and second spring, an equalizer beam pivotally mounted on said equalizer support member; a first shackle assembly pivotally attached to the forward end of said equalizer and pivotally attached to the inner end of said first spring; a second shackle assembly pivotally attached to the rearward end of said equalizer and pivotally attached to the inner end of said second spring, so that an encountered force exerted on one axle deflecting the associated spring is transmitted directly through its associated shackle to the equalizer beam, in turn, through the second shackle which imposes a portion of the encountered force on the spring associated therewith; and front and rear torque rods beneath the related springs and each having a rear end connected to the related axle with the opposite front end connected to a part secured to the frame of the vehicle, said opposite ends of the torque rod being so connected to be positioned at points lying below a line joining the slidable supports for the springs.

4,033,607

MEANS FOR ATTENUATING THE JARRING AND VIBRATION OF A TRUCK-TRACTOR

John Stratton Cameron, La Mirada, Calif., assignor to Jeffries Truck Parts & Equipment, Inc., Bell, Calif.

Filed Oct. 30, 1975, Ser. No. 627,050
Int. Cl.² B60G 11/26
U.S. Cl. 280—711 8 Claims



1. Means for attenuating the jarring and vibration of a truck tractor designed to carry one end of, and pull a trailer, when said tractor is travelling on a road, without any trailer, said tractor including a horizontally disposed rectangular support frame, motor means supported on said frame, a pair of steerable wheels disposed below and supporting through a suspension system the front end of said frame, and a cab therefor, at least one differential axle operatively connected to said motor means, said axle having a housing and wheels at its opposite ends disposed below and supporting through another spring suspension system, the after end of said frame said first mentioned attenuating means comprising:

i. a rigid elongated mounting member, said mounting member being securable transversely of, and to the side of elements forming said rectangular frame, for disposition directly above, and parallel to said differential axle;

ii. an air bellows, said air bellows being expandable downwardly, when provided with air under pressure, to press against said axle housing at a point intermediate the axle, and thereby attenuate road induced vibrations of said support frame through its said suspension system;

iii. a source of air under pressure carried by the truck;

iv. manual valve control means, the last said means being conveniently accessible to the operator of said truck; and

v. air conduit means, said air conduit means being con-

nected to said source of air under pressure and also to said air bellows via said manual valve control means;

whereby, when said tractor is being operated without a trailer load, the truck operator, by operating said manual valve control means, may cause said bellows to be inflated to a desired extent and expanded downwardly against said axle housing to provide thereby an air cushion between said axle and, through said support member, said horizontal frame in opposition to the spring suspension system by which said frame is supported on said differential axle.

4,033,608

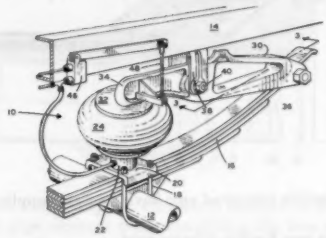
AIR SPRING UNIT

Philip J. Sweet; Buck C. Hamlet, and David L. Sweet, all of Fresno, Calif., assignors to American Carrier Equipment, Fresno, Calif.

Filed Dec. 10, 1975, Ser. No. 639,290

Int. Cl.² B60G *17/00*

U.S. Cl. 280—711 **2 Claims**



1. In combination with a suspension system for the frame of a wheeled vehicle characterized by a load supporting axle and a cantilevered leaf spring assembly mounted on the axle, an improved air spring unit comprising:

A. a pressurizable air bag disposed in substantial vertical alignment with the axle;

B. a pivotal rocker arm having one end vertically supported by said air bag and one end vertically supported by a projected end portion of said cantilevered support assembly;

C. means for connecting said rocker arm in supporting relation with said frame including a bracket affixed to said frame and depending therefrom, and a horizontally oriented pin pivotally connecting the rocker arm to the bracket; and

D. means including a pneumatic circuit connected with said air bag, including a leveling valve connected with said rocker arm, for variably pressuriing said air bag as pivotal motion is imparted to the arm.

4,033,609

TRAILED VEHICLE SUSPENSIONS

George David Malcolm, 5 James Street, Mangere East, Auckland, New Zealand

Filed Aug. 14, 1975, Ser. No. 604,691

Claims priority, application Australia, Aug. 16, 1974, 8553/74

Int. Cl.² B60G *11/04*

U.S. Cl. 280—718 **11 Claims**

1. A suspension, for a trailed vehicle, comprisng:

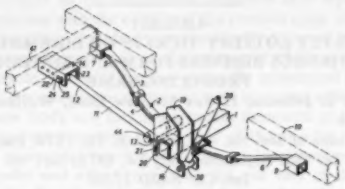
i. a beam axle

ii. respective spring means positioned adjacent each end of said beam axle

iii. respective axle mounting means securing said spring means to said beam axle

iv. respective means for mounting said spring means to a trailed vehicle and adapted to permit limited movement of the spring means longitudinally of the trailed vehicle

v. a respective leading radius arm positioned adjacent each end of the beam axle, said radius arm being pivotably attachable at one of its ends to the trailed vehicle and pivotably coupled at least indirectly at its other end to said beam axle, the arrangement being such that, when the suspension is mounted on the trailed vehicle, the first end of the radius arm is at a position higher than said second end of the radius arm for all conditions of loading of the spring means,



whereby as the beam axle moves upwardly at an end in response to bump conditions it is also caused by the respective radius arm to move in the forward direction of movement of the trailed vehicle and thereby undergo a steering effect tending to oppose the effects on the trailed vehicle of the displacing force.

4,033,610

ELECTRICAL IGNITION CIRCUIT FOR GAS GENERATOR

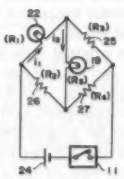
Iichi Shingu; Yutaka Kondo, and Shuho Nishina, all of Aichi, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed May 19, 1975, Ser. No. 578,866

Claims priority, application Japan, Sept. 19, 1974, 49-107936

Int. Cl.² B60R *21/08*

U.S. Cl. 280—737 **11 Claims**



1. An electrically-activated ignition circuit system for a gas generator for inflating a gas bag in a motor vehicle, said gas generator including a high pressure gas bomb having a first ignition filament for exploding a detonator to break a seal therein and an enclosure containing gas-producing substances having a second ignition filament for burning said gas-producing substances, comprising:

a collision sensor,

a voltage source connected in series with said collision sensor to form a series circuit, and

a bridge circuit having first, second, third and fourth arms, the junction of said first and second arms being connected to one end of said series circuit and the junction of said third and fourth arms being connected to the other end of said series circuit, the first arm of said bridge circuit comprising said first ignition filament, said second and third arms being resistors, and said second ignition filament being connected between the junction of said first and third arms and the junction of said second and fourth arms, the resistive values of said arms and said first and second ignition filaments being such that, upon actuation of said collision sensor, the current through said first ignition filament exceeds a first value required to

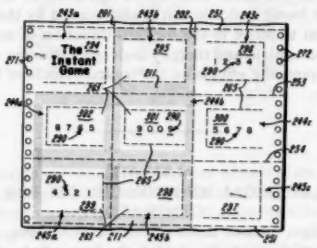
explode said detonator and destroy said first ignition filament and the current through said second ignition filament is less than a second value required to effectively heat said second ignition filament, destruction of said first ignition filament causing the current through said second ignition filament to immediately increase above said first value thereby being heated sufficiently to burn said gas-producing substances.

4,033,611

MULTI-PLY LOTTERY TICKETS OR LIKE ARTICLES, CONTINUOUS BUSINESS FORM AND METHOD FOR PRODUCING SAME

Edward L. Johnsen, 12 Fox Meadow Lane, Wayland, Mass. 01778

Division of Ser. No. 433,461, Jan. 15, 1974, Pat. No. 3,940,124. This application July 14, 1975, Ser. No. 595,733
Int. Cl.² B42D *15/00*
U.S. Cl. 283—6 **8 Claims**



1. A multi-ply lottery ticket comprising:

a single elongate sheet of material having a pair of foldlines extending transversely thereacross to define three contiguous end edge connected panels, said sheet being accordian folded with said panels being disposed in a zig-zag relationship to define a concealed area having opposed first and second interior faces and an exterior face on a common side of said sheet;

a plurality of elongate original indicia located in the concealed area on said second interior face;

an elongate outer hinged tear strip for providing access to the interior of said folded sheet, said strip being defined in said exterior face to be longitudinally disposed on said exterior face and having a hinge located adjcaent a first one of said foldlines, said exterior face having original directly applied indicia positioned thereon;

a plurality of elongate interior hinged tear strips for providing access to the original indicia on said second interior face, said interior tear strips each being defined in the panel including said first interior face to have the longitudinal axis thereof oriented transversely of said outer tear strip and hinged to open outwardly through said exterior face after said outer hinged tear strip has been opened, said interior tear strips having outer faces which are exposed when said outer tear strip is opened,

each of the original indicia on said second interior face being longitudinally aligned with a corresponding one of said interior tear strips and being located to be exposed when said corresponding interior tear strip is opened so that said elongate indicia can be viewed from outside the ticket with both said outer and interior tear strips are open, said original applied indicia directly applied to said exterior face and said second interior face in a single printing run;

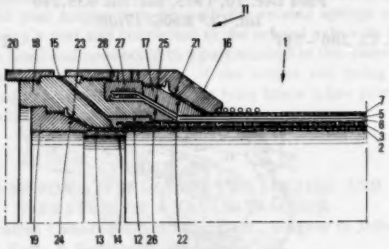
initially inactive adhesive applied to peripheral portions of the surfaces of said panels which are in abutting contact when said panels are accordion folded for forming a permanent seal between said abutting surfaces to permanently bond to one another those portions of said abutting surfaces bordering said outer tear strip, said interior hinged tear strips and the indicia in the concealed area on said second interior face so that said bonded panels must be mutilated to separate same when said adhesive is activated.

4,033,612

ARMORED FLEXIBLE PIPE EQUIPPED WITH A RIGID COUPLING

André Chevalier, Pantin, France, assignor to Institut Francais du Petrole, des Carburants et Lubrifiants, France

Division of Ser. No. 414,103, Nov. 8, 1973, Pat. No. 3,874,064. This application Jan. 23, 1975, Ser. No. 543,307
Claims priority, application France, Nov. 21, 1972, 72.41397
Int. Cl.² F16L *39/02*
U.S. Cl. 285—149 **6 Claims**



1. A flexible armoured pipe having a rigid coupling comprising

at least one flexible tubular core,

at least one first armouring surrounding said core, said first armouring including an elongated member helically wound with a short pitch around said core,

coupling means having a rigid body member positioned at the end of the tubular core and said first armouring, said coupling means including first clamping means for clamping said tubular core and means for anchoring said armouring, wherein said means for anchoring includes at least one bore means within said rigid body member for housing an end of said armouring and channel means through said rigid body member for introducing solidifiable material into said bore means such that said end of said armouring is anchored in said coupling means,

at least one second armouring provided around said at least one first armouring, said second armouring including two layers of wires helically wound in opposite directions with a large pitch over said first armouring,

second clamping means for clamping said two layers and securing said second armouring to said coupling means,

second bore means for housing ends of said two layers of said second armouring, said solidifiable material being introduced into said second bore means for anchoring said ends of said two layers,

an outer tubular covering arranged over said first and second armourings, and

third clamping means for securing said outer covering to said coupling means.

4,033,613

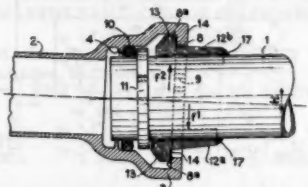
LOCKED JOINT BETWEEN TWO PIPE ELEMENTS CAPABLE OF HAVING AN ANGULAR DEVIATION WITH RESPECT TO EACH OTHER

Georges Eugene Bram, Pont-a-Mousson, France, assignor to Pont-A-Mousson S.A., Nancy, France

Filed June 19, 1975, Ser. No. 588,457
Claims priority, application France, July 5, 1974, 74.23526
Int. Cl.² F16L *21/00*
U.S. Cl. 285—184 **10 Claims**

1. A locking device for locking a joint between two pipe elements against forces tending to separate the pipe elements, in which joint one pipe element is capable of having its axis

angularly deviating from a coaxial position with respect to the other pipe element, there being provided a smooth tubular end portion on a first of the pipe elements and a socket on a second of the pipe elements, the socket having a cavity for an annular sealing element and a free outer end which has on the periphery of the outer end a radial abutment wall defining a first abutment face extending radially inwardly and facing axially inwardly of the socket, the locking device comprising in combination a notch defined by the abutment wall, at least one locking member which is separate from the pipe elements before locking the joint and initially unfixed therefrom and has the general shape of a sector of a cylindrical ring and is capable of passing axially through said notch subsequent to the engagement of the smooth end portion in the socket and defines a radially inner wall for placing adjacent the tubular end portion and has a radially outer projecting portion defining a second abutment face extending radially outwardly for abutment against said first abutment face, said second abutment face facing axially outwardly of the socket in the assembled state of the joint, whereby the locking member has an engagement with the abutment wall which allows the locking



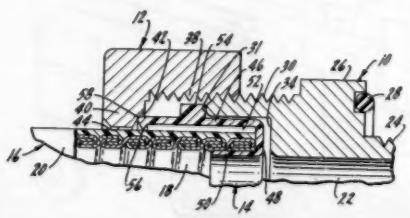
member freedom of angular movement relative to the axis of the second pipe element when assembling the two pipe elements, the locking member having an elongated extension portion which extends from said abutment face outside the socket in a direction parallel to the axis of the first pipe element between the abutment wall and the tubular end portion with sufficient radial clearance between the abutment wall and the extension portion to allow the first pipe element to be assembled with the second pipe element with said angular deviation, the locking member having a circumferential extent allowing the utilization of a plurality of said locking members between the socket and the tubular end portion by insertion thereof in succession by way of the notch subsequent to the engagement of the smooth end portion in the socket, and means independent of the socket for axially locking the extension portion with the first pipe element for precluding movement of the locking member, axially relative to the first pipe element toward the end of the first pipe element in the socket, subsequent to the positioning of the projecting portion of the locking member axially against said abutment face.

4,033,614

CONDUIT FITTING

Ronald P. Hanson, Sycamore, Ill., assignor to Ideal Industries, Inc., Sycamore, Ill.

Filed Mar. 1, 1976, Ser. No. 662,463
Int. Cl.² F16L *33/20*
U.S. Cl. 285—248 **3 Claims**



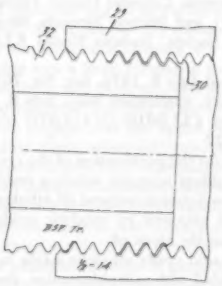
1. A connector assembly for joining flexible metallic conduit to a terminus, including a fitting and nut threaded together for relative rotation and defining an annular compression chamber between them, a plastic ferrule in the compression chamber having a generally cylindrical main body adapted to be mounted on the end of the conduit, an outstanding circumferential shoulder on the main body of the ferrule intermediate the ends thereof to receive an axial thrust from the compression chamber upon closing thereof, an inwardly directed peripherally continuous tooth on one end of the main body arranged to be compressed inwardly into liquid-tight sealing relation with the outside of the conduit upon closing of the compression chamber, a transversely disposed inwardly directed annular end wall on the other end of the main body of the ferrule, a double-backed generally cylindrical pilot on the inner circumference of the end wall in spaced relationship to the main body and forming a socket therewith and dimensioned for free reception of the end of the flexible metallic conduit, an annular taper in the compression chamber on the nut opposite and effective against the one end of the main body of the ferrule with the circumferential tooth to cause deflection of the tooth peripherally inwardly into tight sealing relation with the outside of the conduit, the double-backed pilot having smooth cylindrical inner and outer surface with diameters that effect a sliding relation with the inside and outside of the conduit, the dimensioning of the ferrule being such that it will freely slide into the end of the conduit with the inside diameter of the main body of the ferrule being slightly larger than the outside diameter of the conduit, the axial spacing between the shoulder and the tooth and the radial thickness of the main body of the ferrule in between, on the one hand, and the axial spacing between the annular taper on the nut and the fitting, on the other hand, being such that the tooth will flex inwardly into liquid-tight sealing relation with the outside of the conduit upon axial closing of the compression chamber without effecting excessive resistance to such closing and will lock up with the tooth still inside of the compression chamber without the annular end wall of the ferrule engaging the fitting, the portion of the ferrule in between the tooth and the shoulder being flexed under the axial loading applied between the shoulder, on the one hand, and the tooth, on the other, and without permanent deformation.

4,033,615

PORT THREAD

Raymond A. Miller, Jr., Madison Heights, and Douglas M. Thornton, Rochester, both of Mich., assignors to Ross Operating Valve Company, Detroit, Mich.

Filed June 16, 1975, Ser. No. 587,121
Int. Cl.² F16L *15/00*
U.S. Cl. 285—333 **2 Claims**

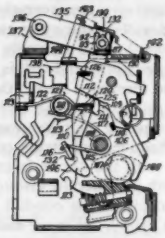


1. A threaded port in a valve body for the reception of hardware having NPT, BSP Tr. or BSP Pl. external threads with nominal tube bores at least between ¼ and 1 inch, comprising threads having a pitch midway between the NPT and BSP pitches for the nominal tube bore and an included angle between thread sides of 57½°.

4,033,616
AUTOMOTIVE VEHICLE DOOR RETARDING AND CLOSING MECHANISM

Jay R. Sheesley, Glencoe, Ill., assignor to Keystone Industries, Inc., Rolling Meadows, Ill.

Division of Ser. No. 284,230, Aug. 28, 1972, Pat. No. 3,989,287. This application June 1, 1976, Ser. No. 691,600
Int. Cl.² E05C 3/26
U.S. Cl. 292—216 6 Claims



1. A device for effecting complete closure of the door of an automotive vehicle or the like after the door has moved to a predetermined, partially closed position, comprising a frame adapted to be mounted on one of said vehicle door and body, a latch movably mounted in said frame and having an opening therein for receiving a striker, said striker being adapted to be mounted on the other of said door and body, said latch being operable when in one position to permit said striker to move into or out of said opening and being operable during movement to another position to engage said striker and effect relative movement thereof to a position corresponding to the closed position of said door, first spring means biasing said latch to said one position, a pawl movable between a first position engaging and preventing movement of said latch and a second position spaced from and permitting movement of said latch, said pawl being adapted to be moved to said second position by manually actuated means mounted on the door of said vehicle, and an operating lever movably carried by said frame and having a portion directly engageable with said latch, said operating lever being movable to a first position permitting movement of said latch relative thereto and to a second position causing movement of said latch to its other position, whereby said operating lever is effective when moved from the first to the second position thereof to cause the door of said vehicle to move to a fully closed position.

4,033,617
PROCESS FOR THE PURIFICATION OF ETHYLENE OXIDE

Gioacchino Cocuzza, Catania; Gianni Torreggiani, Busto Arsizio (Varese), and Michele Sfregola, Bergamo, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

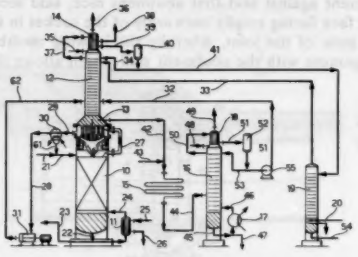
Filed July 8, 1976, Ser. No. 703,342
Claims priority, application Italy, July 8, 1975, 25177/75
Int. Cl.² B01D 3/14; C07D 303/04
U.S. Cl. 203—27 7 Claims

1. A method for the purification of the crude ethylene oxide present in the dilute aqueous solution resulting from the extraction with an aqueous solvent of ethylene oxide from the gaseous stream obtained by catalytic oxidation of ethylene, which comprises the steps of:

a. desorbing said crude ethylene oxide in a desorption column provided with a dephlegmator, thereby to condense in the latter water vapor issuing together with the desorbed crude ethylene oxide from the top of the desorption column;

b. liquefying by compression said desorbed crude ethylene oxide and delivering said liquefied crude ethylene oxide to a fractionating column provided with a reflux condenser, at a point intermediate the top and the bottom, said fractionating column being coupled with said desorption column thereby to use the vapor condensing in said dephlegmator as heating means for said fractionating column and being operated at a temperature of from 50° to 100° C at the bottom, at a pressure of from 4 to 15 Atmospheres and with a reflux ratio of from 0.5:1 to 6:1, discharging a gaseous stream containing non-condensable gases at the top of said reflux condenser, a liquid stream of ethylene oxide containing absorbed non-condensable gases and practically free from acetaldehyde at the bottom of said reflux condenser and a liquid stream of ethylene oxide rich in acetaldehyde at the bottom of said fractionating column;

c. treating said liquid stream discharged at the bottom of the fractionating column of (b) to convert at least 50% of the acetaldehyde present therein into high boiling products;



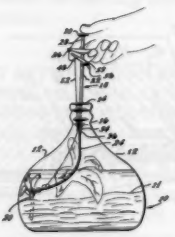
d. delivering said treated liquid stream of (c) to a distillation column provided with a reflux condenser, at a point intermediate the top and the bottom, operating said distillation column at a pressure of from 2 to 6 atmospheres and at a temperature of from 120° to 180° C at the bottom and discharging from said distillation column said conversion products of acetaldehyde and the substances having a higher boiling point than ethylene oxide, at the bottom, and a liquid stream containing ethylene oxide and the acetaldehyde unconverted at step (c), at the bottom of the reflux condenser, said liquid stream of (d) being recycled to the fractionating column of (b) at a point intermediate the top and the bottom; and

e. removing said non-condensable gases absorbed in said liquid stream discharged at the bottom of said reflux condenser of the fractionating column of (b) in a desorption column and recovering from the latter pure ethylene oxide practically free from acetaldehyde.

4,033,618
TERRARIUM PLANTING IMPLEMENT

Gerald P. Lamb, 2648 Hartford St., San Diego, Calif. 92110

Filed June 7, 1976, Ser. No. 693,530
Int. Cl.² A01G 3/00; B25B 7/14
U.S. Cl. 294—19 R 9 Claims



1. A terrarium planting implement comprising:

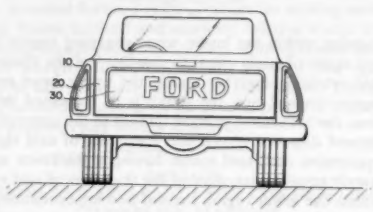
an elongated body member having a rigid and a flexible portion, the portions being substantially co-axial;
a handle member fixedly attached to said rigid portion;
a holding means attached to said flexible portion;
a first actuating means positioned remote from said flexible portion and moveable relative to said portions for selectively releasing said holding means; and
a second actuating means attached to said rigid portion for moving said holding means selectively between a position of substantially co-axial relationship with said rigid portion and a position of non-co-axial relationship with said rigid portion, said second actuating means comprising a lever member pivotally attached at one end to said rigid portion, an elongated actuating member pivotally attached at one end to said lever member intermediate the ends thereof and pivotally attached to said flexible portion at its other end, said elongated actuating member passing through a guide member attached to said rigid portion.

4,033,619

TRANSPARENT TAILGATE FOR STATIONWAGONS AND PICKUP TRUCKS

Diane M. Cox, Depew, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed July 21, 1975, Ser. No. 597,702
Int. Cl.² D60R *13/00*
U.S. Cl. 296—21 **1 Claim**



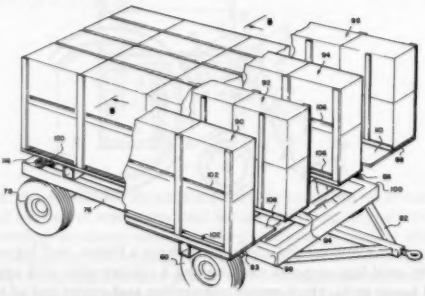
1. A tailgate for station wagons and pickup trucks, comprising:
a tailgate having recessed central aperture,
a transparent panel mounted within said recessed central aperture, and
indicia embedded in said transparent panel, wherein said transparent panel is formed of a one-way glass, thereby being transparent from inside the cabin of the station wagon or pickup truck only.

4,033,620

BEE HIVE CARRIER AND TRANSPORT MEANS

Robert L. Blake, and James David Blake, both of 1821 N. 28th St., Phoenix, Ark. 85008

Filed Sept. 4, 1975, Ser. No. 610,144
Int. Cl.² B62D *33/04*
U.S. Cl. 296—24 C **20 Claims**



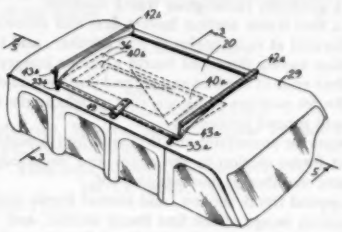
1. A bee hive carrier and transport means comprising a frame; a plurality of closely adjacent bee hive supports on said frame; each support adapted to carry a plurality of bee hives; some of said supports being moveable supports moveably mounted on said frame so as to permit transport and storage of said hives on said frame in close compact relation to each other and whereby some of said bee hive supports may be moved on said frame to positions wherein bee hives, carried thereon, are displaced and spaced from bee hives carried on the remaining ones of said supports and thereby allowing space around said bee hives for the bees to work and for manual servicing of said bee hives said frame is located in a suitable area for the bees to work.

4,033,621

ORIGINAL CONFIGURATION RETENTION EXTENDIBLE ROOF SECTIONS BY MEANS OF UNIVERSAL INSERTS

Garry W. C. Rogers, 402 Kirkfield St., Winnipeg, Manitoba, Canada (R3K 1E6)

Filed Nov. 17, 1975, Ser. No. 632,476
Int. Cl.² B60J *7/18*
U.S. Cl. 296—137 B **3 Claims**

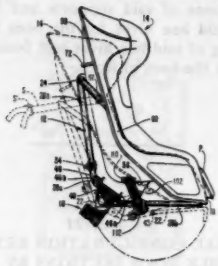


1. In a vehicle roof structure having therein a generally rectangular opening defining a first, second, third and fourth edge, a reliable top of a shape conforming to that of the roof opening, a first edge of said raisable top being hingedly connected to said first edge of said opening, means for locking said raisable top in a closed position; a weatherproof seal comprising a pair of generally vertically disposed plates, each of said plates being fastened to said third and fourth edge in a weather proof fashion, said plates extending beyond the uppermost portion and the lowermost portion of the roof structure, each of said plates having an upwardly opening channel means formed along the upper portion thereof, a pair of generally rectangular members each fastened to a third and fourth edge of said raisable top, a bend formed in the upper portion of each of said members, said bend having a portion extending outwardly and downwardly defining a downwardly opening channel adapted to engage over the upper portion of corresponding one of said plates when said raisable top is in said closed position, a pair of generally triangular rigid filler members, each received between corresponding ones of said upwardly opening channels and said downwardly opening channels when said raisable top is in said raised position to seal off undesirable elements, a side filler member of a generally rectangular shape which lower edge is hingedly connected to said second edge of said opening, the upper edge of said side filler member being adapted to supportively engage a second edge of said raisable top when said raisable top is in said raised position to seal off undesirable elements, and each of two side edges of said side filler member engaging corresponding one of remaining edges of said triangular filler members in a weatherproof fashion when said raisable top is in said raised position.

4,033,622
INFANT'S CAR SEAT

Robert J. Boudreau, Bedford, Pa., assignor to Hedstrom Co., Bedford, Pa.

Filed June 29, 1976, Ser. No. 700,913
Int. Cl.² A47D 1/10
U.S. Cl. 297—250 8 Claims



1. An infant's car seat comprising

A. a truss formed of frame members, said truss having a generally triangular shape in side elevation, and a generally rectangular shape in rear elevation, said truss comprising

1. a generally rectangular frame member,

2. a first frame section having first and second portions formed at right angles to one another, said frame section having third and fourth portions integral with the free ends of the first and second portions, said third and fourth portions being oriented at right angles to the first and second portions,

3. means for connecting the third and fourth portions of the first frame section to the upper and lower edges of the frame member at one side thereof,

4. a second frame section, said second frame section being a mirror image of the first frame section, and

5. means for securing the third and fourth portions of the second frame section to the upper and lower edges of the frame member at the opposite side thereof from the first frame section,

B. a rigid, molded plastic shell interfitting with the hypotenuse of said truss, said shell including a seating platform adjacent the base leg of said truss, a back wall adjacent the rear leg of said truss and spaced apart side walls projecting upwardly from the side edges of the seating platform and back wall, each said side wall being composed of spaced-apart webs which form a rigid beam extending from the top of the shell to the bottom thereof, the spaces between each set of said webs being adapted to receive the members forming the hypotenuse of said truss, and

C. means for securing the shell to members of the truss.

4,033,623
CHILD'S SAFETY RESTRAINT FOR USE IN A VEHICLE

Christian Thary, Lure; Armand R. Bernard, Etampes; Jean Francois Labadie, Etampes, and Olivier P. De La Taille, Etampes, all of France, assignors to Etablissements Bertrand Faure, Le Chesnay, France

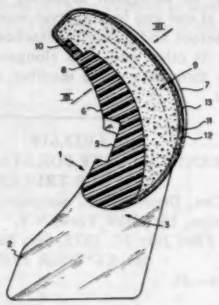
Filed June 10, 1975, Ser. No. 585,598
Claims priority, application France, June 14, 1974, 74.20792
Int. Cl.² B60R 21/02
U.S. Cl. 297—390 5 Claims

1. A child's safety restraint for use in a motor vehicle comprising:

a retaining member adapted to be held in front of a child on one of the vehicle seats and so shaped that in the event of a sudden deceleration of the vehicle, the chest and head of the child will come to rest against a rearmost face of said member,

wherein said member includes a lower part within which there is defined an opening through which the legs of the child can pass, and an upper part which includes a rigid part on the front face thereof and a squab on the rearmost face thereof,

the upper part of said member having a predetermined thickness profile throughout its height while the rigid part of the retaining member is of progressively reduced thickness from the lowermost portion thereof of the uppermost end thereof, said rigid part having a thickness approximately equal to two-thirds the thickness of said retaining

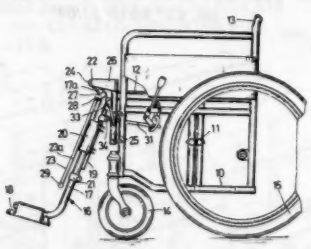


member within the lower, torso-engaging region thereof and approximately equal to one-third of the thickness of said retaining member within the upper head engaging region thereof, and the squab is of increased thickness from the lowermost portion thereof to the uppermost end thereof disposed above and forwardly of said rigid part uppermost end, said squab having a thickness approximately equal to one-third of the thickness of said member within the lower region thereof and approximately equal to two-thirds the thickness of said member within the upper region thereof, said rigid and squab portions of said member therefore having reversely complementary thickened portions so as to define said upper part of said member of said predetermined thickness profile.

4,033,624
INVALID WHEEL-CHAIR

Wilhelm Meyer Jun, Kirchstrasse 7, 4973 Vlotho, Weser, Germany

Filed June 2, 1976, Ser. No. 692,214
Claims priority, application Germany, Apr. 2, 1976, 7610263[U]
Int. Cl.² A47C 7/50
U.S. Cl. 297—434 10 Claims



1. A wheeled invalid-chair comprising a frame, and leg-supports, said leg-supports each having a carrier-spar with upper and lower ends, pivot means connecting said upper end of said carrier-spar to said frame to pivot relative thereto about a

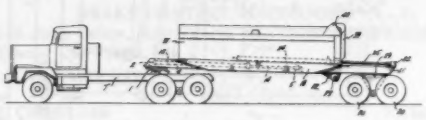
horizontal axis, a foot rest plate carried by said carrier-spar at said lower end thereof, an actuating lever and hinge means connecting said lever to said carrier-spar at a position spaced from said horizontal axis, said frame having abutment means engageable by said lever for pivoting said leg support about said axis to adjust the position thereof relative to said frame.

4,033,625

ADJUSTABLE-LENGTH SEMITRAILER CHASSIS AND METHOD OF SEMITRAILER MANEUVERING

Tyman H. Fikse, 4263 S. 172, Seattle, Wash. 98188

Filed Mar. 28, 1975, Ser. No. 563,195
Int. Cl.² B60P 1/18
U.S. Cl. 298—22 R 24 Claims



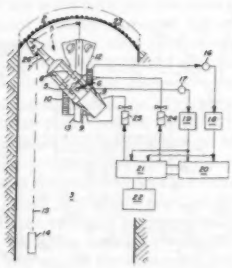
1. A semitrailer comprising load-carrying means, and a chassis supporting said load-carrying means and including front tractor-connecting means, rear wheeled supporting means, powered forward shifting means for moving said load-carrying means forward and rearward relative to said tractor-connecting means and powered rear shifting means for moving said wheeled supporting means forward and rearward relative to said load-carrying means and thereby altering the spacing between locations on the ground to which load carried by said load-carrying means is applied.

4,033,626

METHOD AND APPARATUS FOR CONTROLLING A TUNNELING MACHINE

Anton Dinkelbach, Gelsenkirchen, Germany, assignor to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H., Bochum, Germany

Filed July 12, 1976, Ser. No. 704,311
Claims priority, application Germany, July 16, 1975, 2531759
Int. Cl.² E21D 9/10
U.S. Cl. 299—1 9 Claims



1. A method for controlling the displacement of a cutting tool by a pivot arm supported for universal movement upon a tunneling machine, said tunneling machine including means for displacing said cutting tool along a course of travel to form a tunnel having a desired profile by releasing material from the tunnel heading face, said method including the steps of:

projecting a laser beam in a direction parallel with the desired tunnel heading toward the heading face of the tunnel,

moving the tunneling machine into a set-point position adjacent the heading face of the tunnel,

displacing said pivot arm to move a lser detector supported thereby into a position for impingement by the laser beam while the tunneling machine remains at said set-point position,

generating a first set of signals corresponding to a measured set of pivot angles representing the pivoted position of the pivot arm with respect to said set-point position of the tunneling machine,

effecting a plunge cut by said cutting tool into the heading face of the tunnel,

thereafter again displacing said pivot arm to move said laser detector into a position for impingement by the laser beam,

generating a second set of signals corresponding to a second measured set of pivot angles of said pivot arm after effecting said plunge cut,

generating control signals corresponding to set-point values of a desired tunnel profile,

comparing said first set of signals with said second set of signals to obtain deviation signals corresponding to a position change by the tunneling machine from said set-point position, and

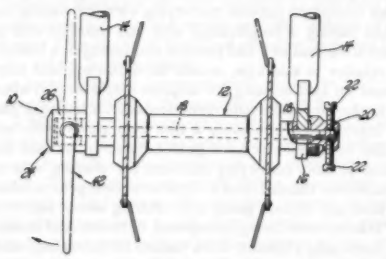
modifying said control signals with said deviation signals for controlling displacement of said cutting tool within a course of travel while releasing material from the heading face of the tunnel.

4,033,627

QUICK RELEASE DEVICE

Pino D. Morroni, Warren, Mich., assignor to Pino International Ltd., Warren, Mich.

Filed Sept. 8, 1975, Ser. No. 611,176
Int. Cl.² B62K 25/02
U.S. Cl. 301—111 15 Claims



1. A quick release assembly for supporting a bicycle wheel hub on a bicycle frame comprising: an elongated rod having first and second ends; abutment means disposed on said first end of said rod for engaging a bicycle frame; and clamping means disposed on said second end of said rod for movement longitudinally of said rod between a clamping position to clamp a wheel hub on a bicycle frame by placing said rod in tension and a release position to release said rod from said tension for releasing the wheel hub from the bicycle frame, said clamping means including a clamping head for engaging a bicycle frame, a reaction member separate from said clamping head and separate from said rod, connecting means connecting said reaction member to said second end of said rod for placing said rod in tension, and actuation means operatively interconnecting said clamping head and said reaction member for effecting relative movement between said clamping head and said reaction member in a direction longitudinally of said rod between said clamping and release positions, said actuation means including a cam member rotatably supported by

said clamping head for rotation about a rotational axis which extends transversely of said rod, said cam member having an eccentric cam engaging said reaction member for effecting said relative movement between said clamping head and said reaction member, said second end of said rod including stop means engaging said eccentric cam for preventing rotation of said rod relative to said cam member and said clamping head, said eccentric cam being circular in cross section about an eccentric axis which is laterally displaced from said rotational axis, said stop means including an arcuate recess in said second end of said rod and concentric with said eccentric cam.

4,033,628

PARTICULATE MATERIAL CONVEYING ARRANGEMENT

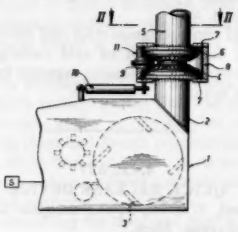
Karl Moosbrucker, Saulgau, Wurttemburg, Germany, assignor to Josef Bautz GmbH, Saulgau, Wurttemberg, Germany

Filed Oct. 14, 1975, Ser. No. 621,659

Claims priority, application Germany, Oct. 16, 1974, 2449152

Int. Cl.² B65G *53/40*

U.S. Cl. 302—34 **9 Claims**



1. A device for conveying particulate material entrained in a stream of a gaseous medium, particularly in an agricultural ejector, a combination comprising a housing having an interior; an elongated tubular conveying element having one end portion having a longitudinal axis and another end portion spaced from said one end portion and facing in a lateral direction relative to said axis; means for mounting said conveying element on said housing for angular displacement about said axis to thereby select said direction and including a planetary gear transmission including a first gear stationarily mounted on said housing, a second gear connected to said one end portion of said conveying element for sharing said angular displacement thereof, and at least one third gear meshing with said first and second gears and orbiting about said axis, said gear transmission being interposed between said housing and said conveying element; drive means for actuating said transmission; and means for advancing the gaseous medium with the particulate material entrained therein from said interior of said housing through said conveying element and out of said other end portion thereof in a selected direction.

4,033,629

AUTOMATIC FREIGHT CAR BRAKE APPARATUS WITH SPRING-APPLIED FLUID-PRESSURE-RELEASED HAND BRAKE

Williard P. Spalding, Penn Hills, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed June 9, 1976, Ser. No. 694,146

Int. Cl.² B60T *13/04*

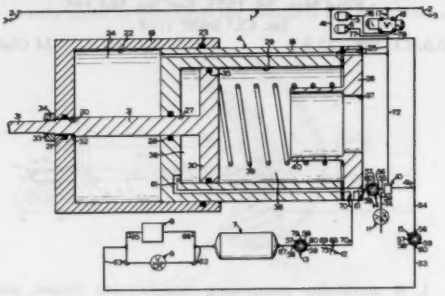
U.S. Cl. 303—2 **21 Claims**

1. In a vehicle combined fluid pressure and hand brake apparatus including a normally charged brake pipe, an auxiliary reservoir, an emergency reservoir and a fluid pressure operated brake control valve device operable responsively to variations of pressure in the brake pipe to effect fluid pressure brake applications and brake releases, said brake apparatus comprising:

a. fluid pressure operated means for effecting a brake application on the vehicle and a subsequent brake release responsive to operation of the brake control valve device to effect the supply of fluid under pressure from one or both of said reservoirs to said fluid pressure operated means and the release of fluid under pressure therefrom, wherein the improvement comprises;

b. a brake release reservoir,

c. means for effecting charging of said brake release reservoir to a pressure higher than that in the normally charged brake pipe,



d. spring means for causing a brake application on the vehicle independently of the operation of the brake control valve device,

e. fluid motor means operable in response to the supply of fluid under pressure thereto to render said spring means ineffective to cause a brake application on the vehicle, and

f. means whereby fluid under pressure may be supplied to said fluid motor means from any one of a plurality of sources of fluid under pressure.

4,033,630

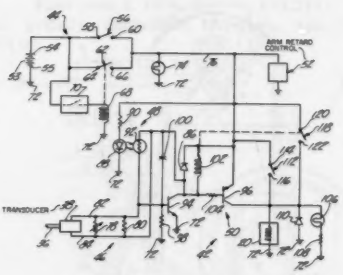
REMOTE CONTROL CIRCUIT FOR ELECTRIC TRAILER BRAKES

Harold C. Hubbard, Lansing, Mich., assignor to Motor Wheel Corporation, Lansing, Mich.

Filed Sept. 22, 1975, Ser. No. 615,234

Int. Cl.² B60T *13/68, 13/74*

U.S. Cl. 303—7 **11 Claims**



1. In a tractor/trailer combination having a source of electrical energy wherein said tractor is equipped with a hydraulic brake system and said trailer is equipped with an electric brake system of the type in which brake torque is a function of electric current through an electromagnetic brake coil, a circuit for controlling said coil current comprising a hydraulic transducer operatively connected to said hydraulic brake system to provide an electronic first signal which varies as a

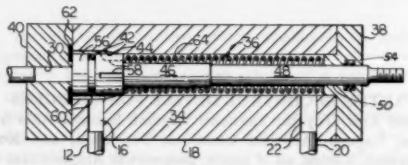
function of hydraulic brake fluid pressure, amplifier means having an input and an output to apply said current from said energy source to said brake coils in proportion to said first signal, said input being operatively connected to said hydraulic transducer to receive said electronic first signal and said output being connected to said brake coils, current responsive means operatively connected between said source of electrical energy and said input of said amplifier means for electronically comparing said first signal to a first minimum threshold to provide a second signal when said first signal exceeds said first threshold, and means responsive to said second signal to provide a direct connection between said energy source and said brake coils independently of said amplifier means.

4,033,631

BRAKE CONTROL MECHANISM

David John Balzer, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 24, 1975, Ser. No. 634,951
Int. Cl.² B60T *15/04*
U.S. Cl. 303—50 **7 Claims**



1. In a vehicle having a pressurized hydraulic system including a sump and a normally applied brake releasable by hydraulic pressure, a brake release mechanism comprising,

a valve

conduit means for communicating hydraulic fluid from a pressure source in the vehicle hydraulic system to said valve,

brake conduit means for communicating fluid from the valve to the vehicle brake,

exhaust conduit means for communicating fluid in the valve with the vehicle hydraulic system sump, and

a single control means for selectively operating the valve from a remote location on the vehicle,

wherein the valve comprises a valve body, a main bore provided in the valve body, an enlarged bore provided in the valve body at one end of the main bore, caps closing the ends of the main bore and the enlarged bore respectively, a spool slidably disposed within the main and enlarged bores having a stem portion extending through the cap closing the main bore and engaged by the control means, and a land portion disposed within the enlarged bore and adapted to abut the cap closing said enlarged bore, an exhaust port provided in said cap, seal means for sealing the exhaust port upon abutment of said cap by the land portion, spring means biasing the valve spool land portion against the seal means of the exhaust port so that it normally closes the exhaust port, an inlet port communicating with the enlarged bore, and an outlet port communicating the main bore and with the brake conduit means and slot means for communicating the enlarged bore and inlet port with the main bore and outlet port while the valve spool closed the exhaust port,

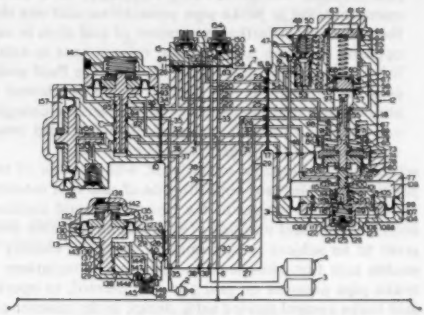
whereby the valve is operable by said control means to selectively communicate the pressure conduit means with the brake conduit means to release the vehicle brake, or with the exhaust conduit means to allow application of the normally applied brake, or to pressurize fluid in the valve and brake conduit in response to said control means to release the brake when pressurized hydraulic fluid is not available in the pressure conduit means.

4,033,632

CONTROL VALVE DEVICE WITH CHANGE-OVER MEANS FOR DIRECT OR GRADUATED RELEASE OPERATION

Richard L. Wilson, Monroeville, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Oct. 21, 1976, Ser. No. 734,393
Int. Cl.² B60T *15/52*
U.S. Cl. 303—74 **12 Claims**



1. A fluid pressure controlled vehicle brake apparatus comprising, in combination:

a. a normally charged brake pipe, variations of the fluid pressure in which are effective to control brake applications and brake releases on the vehicle,

b. an auxiliary reservoir normally charged to the pressure carried in said brake pipe,

c. a second reservoir normally charged to the pressure carried in said brake pipe,

d. fluid pressure operated braking means for effecting a brake application on the vehicle,

e. a fluid pressure operated brake control service valve device comprising:

i. valve means operable to effect the supply of fluid under pressure from said auxiliary reservoir to said fluid pressure operated braking means and the release of fluid under pressure from said fluid pressure operated braking means to atmosphere,

ii. a stem coaxially arranged with respct to said valve means for effecting the operation thereof,

iii. a first movable abutment subject on one side to the pressure of fluid in said brake pipe and subject on the opposite side to the pressure in one of said reservoirs, said first movable abutment being operatively connected to said stem to effect its movement in one direction in response to a reduction in brake pipe pressure on said one side relative to the pressure in one of said reservoirs on said opposite side to cause one end of said stem to operate said valve means to effect the supply of fluid under pressure from said auxiliary reservoir to said braking means to cause a brake application on the vehicle,

iv. reservoir charging valve means carried on and so operable by said first movable abutment in response to said reduction in brake pipe pressure as to cut off charging of one of said reservoirs and in response to an increase in the pressure in said brake pipe to the pressure in one of said reservoirs to enable charging of one of said reservoirs,

v. a second movable abutment that may be selectively subject on one side to the fluid under pressure supplied by said valve means to said braking means or to atmospheric pressure and subject constantly on the opposite side to atmospheric pressure, said second movable abutment being so connected to said valve stem as to, when subject on said one side to fluid under pressure supplied to said braking means, effect movement of

said stem in a direction opposite said one direction in response to the force of fluid under pressure acting on said second abutment in said opposite direction slightly exceeding the fluid pressure force acting in said one direction on said first movable abutment to cause operation of said valve means to cut off flow of fluid under pressure from said auxiliary reservoir to said braking means without causing operation of said charging valve means to effect charging of one of said reservoirs, said first movable abutment being responsive to a subsequent increase in brake pipe pressure on said one side thereof to effect further movement of said stem in said opposite direction to cause said valve means to establish a venting communication whereby the fluid under pressure supplied to said braking means is released to atmosphere, and operation of said reservoir charging valve means to enable charging of one of said reservoirs, wherein the improvement comprises:

f. selectively positionable means that, while in one of two positions, enables said opposite side of said first movable abutment to be subject to the pressure in said auxiliary reservoir, and said one side of said second movable abutment to be subject to atmospheric pressure, thereby to enable said first abutment, in response to variations of brake pipe pressure on said one side thereof, to operate said brake control service valve device in the manner of a direct release control valve device, and, while in the other of its two positions, enables said opposite side of said first movable abutment to be subject to the pressure in said second reservoir, and said one side of said second movable abutment to be subject to the pressure in said fluid pressure operated braking means, thereby to enable said first and second abutments, in response to variations of brake pipe pressure on said one side of said first abutment, to operate said brake control service valve device in the manner of a graduated release control valve device.

4,033,633

FREQUENCY CONTROL, AND SENSING CIRCUIT

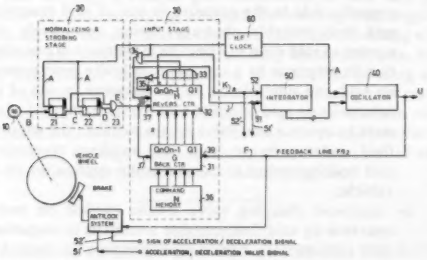
Norbert Miller, Stuttgart; Peter Jurgen Schmidt, and Bernd Przybyla, both of Schwieberdingen, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Mar. 18, 1976, Ser. No. 668,296

Claims priority, application Germany, Mar. 22, 1975, 2512738

Int. Cl.² B60T *8/08*

U.S. Cl. 303—97 **20 Claims**



1. Frequency control circuit having an input signal (E) signal generating means (10, 20),

means (36) providing a reference signal representative of a reference number (N),

an input stage (30) having the input signal and the reference signal applied thereto,

an oscillator (40) and an integrator (50) connected to and controlling the oscillation frequency of the ocillator, the output from the oscillator providing an output signal being fed back to the input stage (30) to provide, cyclically, an error signal to the integrator (50) by comparison in the input stage of said output signal with the reference signal and the input signal,

wherein the input stage comprises

means (31) connected to and controlled by the oscillator (40) determining the number of oscillations of the output signal from the oscillator (40) within a predetermined time period (T), said oscillation number determining means being further connected to and controlled by said reference means (36) and determining the difference (Z1, Z2) between said number of oscillations within the predetermined time period (T) and the reference number (N), and providing said error signal (J, K) representative of said difference upon elapse of said time period.

4,033,634

ANTISKID CONTROL DEVICE FOR VEHICLES

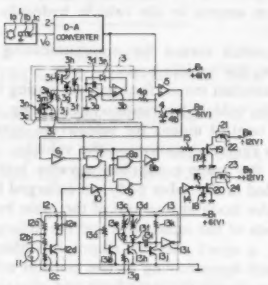
Hiroshi Arai, Toyota; Takahiro Nogami, Susono; Akio Sugiura, Nagoya; Atutoshi Okamoto, Toyohashi, and Koichi Toyama, Kariya, all of Japan, assignors to Nippondenso Co., Ltd, Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed June 18, 1975, Ser. No. 588,173

Claims priority, application Japan, June 28, 1974, 49-74661

Int. Cl.² B60T *8/02*

U.S. Cl. 303—103 **8 Claims**



3. An antiskid control device for vehicles comprising:

means for detecting the locking condition of a wheel upon braking to generate a release signal,

a timer circuit for generating a timing signal having a predetermined time duration in synchronism with the extinction of the release signal from said detecting means,

braking pressure modulating means decreasing the braking pressure on the wheel in response to the release signal from said detecting means, and rapidly increasing the pressure reapplication rate of the braking pressure at the initial stage of the pressure reapplication in response to the timing signal emitted from said timer circuit upon extinction of the release signal, and

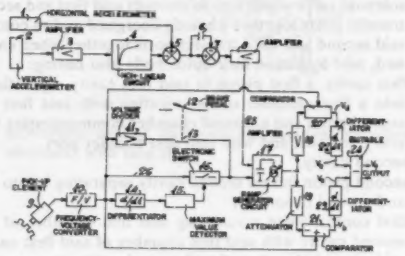
correcting means including sensor means for detecting a vehicle body deceleration upon braking and acting on said braking pressure modulating means to increase the pressure reapplication of the braking pressure when the vehicle body deceleration has a large value.

4,033,635

ELECTRONIC CONTROL DEVICES APPLICABLE TO ANTI-SKID EQUIPMENT IN AUTOMOBILE VEHICLES

Jose Maria Tarrafeta Montoya, Madrid, Spain, assignor to Fabrica Espanola Magnetos, S.A., Madrid, Spain

Continuation of Ser. No. 515,496, Oct. 17, 1974, abandoned.
This application Apr. 1, 1976, Ser. No. 672,774
Claims priority, application Spain, Mar. 13, 1974, 424230
Int. Cl.² B60T 8/10
U.S. Cl. 303—109 1 Claim



1. An electronic control device applicable to anti-skid equipment in automobile vehicles, said device comprising;

elements for maintaining each wheel of a vehicle at an optimum value of slip for which road surface to wheel adherence is at a maximum level, a velocity corresponding to said slip value being obtained from a first unit generating a signal corresponding to an acceleration of the vehicle and a second unit generating a signal corresponding to the velocity of the wheel at an instant in which the acceleration of the wheel is at a maximum value with its brake released;

means for generating a signal corresponding to a deceleration of the vehicle comprising a longitudinal accelerometer and a corrector circuit for eliminating any errors due to road slope;

means for generating a signal corresponding to the velocity of the wheel;

means for generating a comparison signal representative of the velocity corresponding to the optimum value of slip from the deceleration of the vehicle, said comparison signal being corrected to a value of the optimum slip level in each reacceleration of the wheel by means of a differentiator and a detector of maximums;

means for comparing the velocity of each wheel with a comparison signal, and according to a result thereof, applying and releasing the brake pressure of said wheel as required; and

means for changing the comparison signal depending upon the response of the brake actuator of the vehicle.

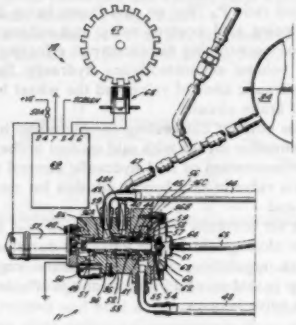
4,033,636

VEHICLE ANTI-SKID BRAKING APPARATUS

Anthony P. R. Rolt, Stratford-on-Avon, and Frederick J. Walker, Banbury, both of England, assignors to Harry Ferguson Limited, England

Filed Aug. 7, 1975, Ser. No. 602,920
Claims priority, application United Kingdom, Aug. 22, 1974, 36861/74
Int. Cl.² B60T 8/08
U.S. Cl. 303—114 3 Claims

1. An anti-skid braking apparatus for a vehicle, the apparatus comprising a booster including a first actuator element operable in one direction to provide a brake-assisting force to assist a driver's braking effort and a second actuator element operable in an opposite direction to provide a brake-opposing force to oppose a driver's braking effort, switching means for actuating the second actuator element, an anti-skid sensor device for actuating the switching means and wherein the second actuator element includes means for causing the maximum brake-opposing force to always be greater than the maximum brake-assisting force.

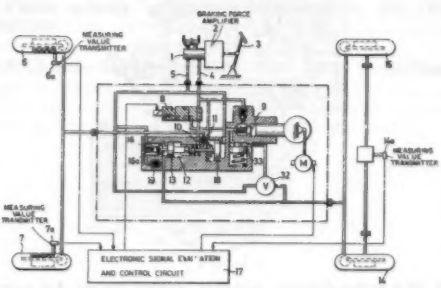


4,033,637

ANTI-LOCK REGULATING SYSTEM

Heinz Leiber, Leimen, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Filed Dec. 17, 1975, Ser. No. 641,758
Claims priority, application Germany, Dec. 18, 1974, 2459775
Int. Cl.² B60T 8/06
U.S. Cl. 303—115 13 Claims



1. In an anti-lock regulating system for brakes associated with wheels, having a first brake circuit including the brake of at least one wheel; a braking pressure regulating device for regulating the braking pressure when the wheels have a tendency to lock; a hydraulic braking pressure generator means coupled to the first brake circuit through the braking pressure regulating device; the improvement comprising

a. a second brake circuit including the brake of at least one other wheel;

b. a hydraulic control valve connecting said second brake circuit with said hydraulic braking pressure generator means; said hydraulic control valve having a normally open position and a closed position;

c. a control piston having opposite first and second faces;

d. means for exposing said first face of said control piston to a pressure P_R' which is dependent from the braking pressure P_R prevailing in said second brake circuit;

e. means defining a control chamber bounded by said second face of said control piston;

f. a throttle means connecting said braking pressure regulating device with said control chamber;

g. means for exposing said second face of said control piston to a pressure P_{St}' which is dependent, through said throt-

tle means, from the pressure P_{SI} as set by said braking pressure regulating device;

h. means connecting said control piston with said hydraulic control valve; said control piston, in response to a predetermined ratio P_R'/P_{SI}' on said faces, being displaced for first closing said control valve and subsequently, as a result of a continuing displacement, effecting an increase in the volume accommodating hydraulic fluid between said hydraulic control valve and the wheel brake of said second brake circuit;

i. a bypass conduit connecting the hydraulic braking pressure generator means with said second brake circuit with the circumvention of said hydraulic control valve;

j. a bypass valve in said bypass conduit for controlling the same; and

k. means for normally maintaining open said bypass valve and for closing said bypass valve for duration of braking pressure regulation, whereby a more rapid pressure buildup in said second brake circuit is effected when said bypass valve is open.

4,033,638

HYDRO-DYNAMIC ANTI-SKID BRAKING SYSTEMS

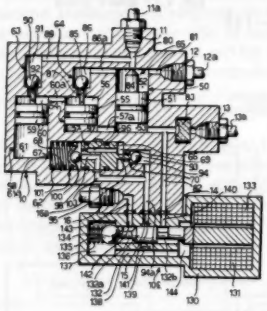
Antonino Bertone, Sant'Antonino (Vercelli); Enrico Rivetti, and Maurizio Cattaneo, both of Turin, all of Italy, assignors to Fiat Societa per Azioni, Turin, Italy

Filed Oct. 28, 1976, Ser. No. 736,637

Claims priority, application Italy, Nov. 7, 1975, 69751/75

Int. Cl.² B60T *8/10*

U.S. Cl. 303—116 **7 Claims**



1. In a hydro-dynamic anti-skid braking system, for motor vehicles, of the type comprising:

a master cylinder,

a brake pedal controlling said master cylinder,

a plurality of brake actuators at least one for each wheel of the vehicle,

a reservoir of brake fluid,

a modulating valve controlled by said brake pedal,

a volumetric pump operating to circulate brake fluid from said brake fluid reservoir through said modulating valve controlled by said brake pedal and back to said reservoir,

at least one hydraulic distributor having a solenoid valve and first, second, third and fourth ports,

means connecting said first port to said master cylinder,

means connecting said second port to said brake actuators of at least some of the wheels of said vehicle,

means connecting said third port to the output side of said volumetric pump, and

means connecting said fourth port to said reservoir,

sensor means associated with each of said wheels of said vehicle, operating to detect the speed of said wheels and producing respective output signals,

a processing circuit,

means feeding said output signals from said sensor means to said processing circuit which produces an output signal whenever any of the said wheels of said vehicle is in a skid or incipient skid state,

means feeding said output signal to said solenoid valve of said hydraulic distributor whereby to energise said solenoid valve whenever one of said wheels of said vehicle is in a skid or incipient skid state, whereby to control said distributor to release the brakes when a skid or incipient skid is detected,

the improvement wherein,

said hydraulic distributor comprises a body having first, second and third transfer ports communicating with said solenoid valve which acts to connect said first and second transfer ports together when de-energised and to connect said second and third transfer ports together when energised, said hydraulic distributor body also having:

a first cavity, a first piston in said first cavity separating it into a first chamber communicating with said first and second ports and a second chamber communicating with said third port and with said first transfer port,

a second cavity,

a second piston in said second cavity separating it into first and second chambers,

a first control valve connecting said first chamber of said second cavity with said first chamber of said first cavity, said second chamber of said second cavity communicating with said second chamber of said first cavity,

a third cavity,

a second control valve,

control means,

a third piston in said third cavity separating it into first and second chambers the first communicating with both said first chamber of said second cavity and, via said second control valve with said first port, and the second communicating with said second transfer port via said control means which permit a controlled flow of fluid from said second chamber of said third cavity through said second and third transfer ports to said fourth port when said solenoid valve is energised,

a projection on said first piston serving as a shutter to close communication between said first port and said first chamber of said first cavity when the pressure in said first chamber of said first cavity is lower than the pressure in said second chamber of said first cavity, said first and second control valves acting to prevent the flow of fluid into said first chambers of said second and third cavities respectively when the pressure in these is higher then the pressure in said second chambers of said second and third cavities respectively.

4,033,639

DRAWER SLIDE

Roland A. Benoit, and Richard H. Duprey, both of Danielson, Conn., assignors to Interroyal Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,200

Int. Cl.² F16C *21/00*

U.S. Cl. 308—3.6 **15 Claims**

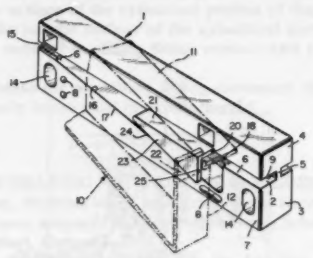
1. Drawer slide for holding a draw against unintentional removal comprising:

a track for guiding the drawer during inward and outward movement,

said track being interrupted in the vicinity of its outward end by a depressed track section having a downwardly inclined track portion in the direction of inward drawer movement, and

a cooperating offset drawer stop operatively positioned out of the path of the track and extending into the path of the drawer and situated at a level sufficiently above the depressed track section to permit the drawer upon inward and outward movement to be intentionally correspond-

ingly downwardly tilted at said depressed track section to clear said stop yet hold the drawer upon normal outward



movement against unintentional removal by otherwise abutment with said stop.

4,033,640

SEAL BEARING APPARATUS

Juan A. Garcia, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Division of Ser. No. 562,691, March 27, 1975. This application July 20, 1976, Ser. No. 707,132

Int. Cl.² F16C *17/00*

U.S. Cl. 308—4 A 6 Claims

1. A balanced pressure, sealed bearing apparatus, comprising:

a. a plurality of balls;

b. an upper hard metallic race;

c. a lower hard metallic race;

d. an upper shoulder abutting said upper race fabricated of a metal which is softer than said upper race;

e. a lower shoulder abutting said lower race fabricated of a metal which is softer than said lower race;

f. a seal sleeve closing off and defining a space for sealing lubricant about the interior of said bearing, and

g. a lower seal assembly having a plurality of movable seals which are pressure responsive to balance internal bearing pressure with the ambient external pressure.

4,033,641

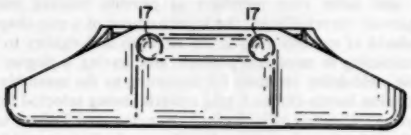
FLANGE MOUNT

Earl S. Cain, Portola Valley; Jerome A. Carlson, Woodside, and George E. Goodrich, San Carlos, all of Calif., assignors to Tribotech, Redwood City, Calif.

Filed Mar. 5, 1976, Ser. No. 664,164

Int. Cl.² F16C *13/00, 35/00, 39/00*

U.S. Cl. 308—15 8 Claims



1. A flange mount including a flange plate, a bearing receiving flange extending outwardly from one face thereof and adapted to receive and hold a bearing therein, the other face of said flange plate defining a mounting surface substantially perpendicular to the axis of said bearing receiving flange for mounting the flange on a supporting surface, the edges of said flange plate being bent in the same direction as the bearing receiving flange to stiffen the mounting plate with portions of said bent edges extending to and engaging the end of the bearing receiving flange.

4,033,642

SHAFT MOUNTING APPARATUS

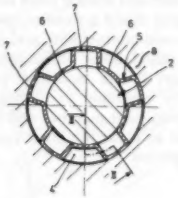
Ulrich Sorgatz, Wolfsburg, and Hans-Jurgen Kogge, Fallersleben, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany

Filed Feb. 18, 1976, Ser. No. 659,114

Claims priority, application Germany, Feb. 20, 1975, 2507253

Int. Cl.² F16C *27/00*

U.S. Cl. 308—26 8 Claims



1. An apparatus for mounting an extended shaft, having a selected range of operating frequencies and a natural resonant vibrational frequency, to a support structure, comprising:

at least one bearing supporting said shaft arranged between said structure and said shaft, and having bearing play;

a support collar, on said structure, having an interior surface concentric to said shaft;

and means, permanently resilient in all radial directions, mounted between said shaft and said surface, for shifting the resonant frequency of said shaft to a frequency above said operating frequency range.

4,033,643

BALL BEARING ASSEMBLY WITH DUST SHIELD

Donald A. Miller, Sterling, Ill., and William O. Setele, Independence, Ohio, assignors to Kendale Industries, Inc., Valley View, Ohio

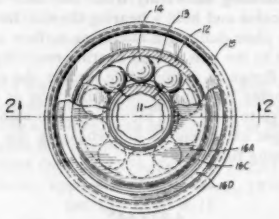
Filed June 25, 1976, Ser. No. 700,016

Int. Cl.² F16C *33/80*

U.S. Cl. 308—187.2 5 Claims

1. In a bearing assembly for a roller conveyor, the assembly including an outer housing adapted to engage in the open end

portion of a conveyor tube for providing bearing support for the tube, an outer race member mounted to and within the said housing concentrically thereof, an inner race member concentrically in spaced relationship to said outer race member, said inner race member having an annular groove formed in its outer circumferential surface thereof adjacent a first axial end thereof away from said outer race member, and a plurality of ball bearings arranged in a circle between the inner and outer race members to provide bearing interengagement therebetween, the improvement of a cup-shaped dust shield of material having the strength and rigidity to be self-sustaining in mounted position and having a degree of flexible yieldability required for mounting to the assembly in the position herein claimed, said material being selected from the group consisting of polyethylene, nylon and Teflon, said dust shield having an outer portion disposed adjacent said first



axial end of the assembly, said outer portion having an inner edge portion disposed in said annular groove in the inner race member and firmly held therein to support the shield in position, said shield having an axially and radially portion extending at an angle from said outer portion and spaced radially outward of said outer race member to clear the same, said shield having a circumferential outer edge portion adjoining the innermost portion of the said shield extending away from said outer race member and spaced from said housing to clear the same, whereby said shield is fixed to said inner race member and free of frictional contact with said outer race member sand housing, said shield being sufficiently rigid to be self sustaining for support in the described position and being sufficiently resiliently yieldable to permit the shield to be pressed upon said inner race member and for said inner edge portion of the shield to clear the inner race member and to enter said annular groove.

4,033,644

METHOD FOR PRELOADING BEARING

Josef Reneerkens, Bensberg-Refarth, Germany, assignor to Ford Motor Company, Dearborn, Mich.

Filed July 19, 1976, Ser. No. 706,335

Claims priority, application Germany, July 19, 1975, 2532370

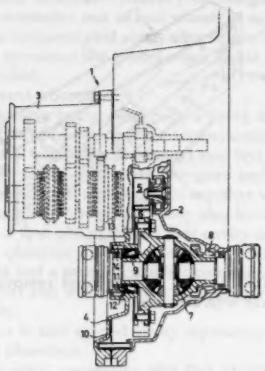
Int. Cl.² F16C *25/00*

U.S. Cl. 308—207 A **8 Claims**

1. A preloaded bearing construction comprising a housing, a member rotatable relative to said housing and a bearing interposed between said member and said housing;

a spring engaging a portion of said bearing and exerting a preload force upon said bearing;

an elastomeric plastic material disposed about a portion of said spring constructed to limit deflection of said spring in



the direction opposite to the direction in which it exerts its preload force.

4,033,645

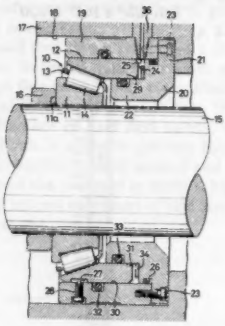
BEARING DEVICE

Tomio Yamada, Nara, Japan, assignor to Koyo Seiko Company, Limited, Osaka, Japan

Filed Apr. 26, 1976, Ser. No. 680,504

Int. Cl.² F16C *35/06*

U.S. Cl. 308—207 A **5 Claims**



1. A device including a preload-adjustable roller bearing adapted to carry a radial load and a thrust load at the same time, the device comprising:

a sleeve-like outer member to be fixedly fitted in a bore of a housing,

an annular inner member of L-shaped section having a flange secured to one end of the outer member, the inner member providing an annular pressure chamber between the outside peripheral surface of its cylindrical portion and the inside surface of the outer member for receiving a pressure fluid,

an outer ring constituting the bearing and fitted in the outer member in contact with the inside surface thereof slidably only in an axial direction thereof, the outer ring having a cylindrical portion axially integrally extending from its one end having a smaller inside diameter, the outer ring having its cylindrical portion slidably fitted in the pressure chamber so as to be subjected directly to the pressure of the fluid,

sealing means oiltightly sealing a clearance between the outside surface of the outer ring and the inside surface of

the outer member in sliding fitting contact with each other,

sealing means oiltightly sealing a clearance between the inside surface of the cylindrical portion of the outer ring and the outside surface of the cylindrical portion of the inner member in sliding fitting contact with each other, and

guide means for permitting sliding movement of the outer ring only in the axial direction thereof.

4,033,646

ROLLER BEARING WITH ROTATABLE GUIDE CAGE

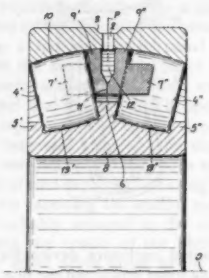
Franz Lang, Stadtlauringen, and Erwin Dees, Kutzberg, both of Germany, assignors to Kugelfischer Georg Schafer & Co., Schweinfurt, Germany

Filed Mar. 21, 1975, Ser. No. 560,704

Claims priority, application Germany, Mar. 21, 1974, 2413612

Int. Cl.² F16C *19/00*

U.S. Cl. 308—218 **8 Claims**



1. A journal bearing comprising:

an inner race with an outer peripheral surface and an outer race with an inner peripheral surface centered on a common axis, said races being symmetrical about a midplane transverse to said axis;

two sets of bearing rollers symmetrically disposed on opposite sides of said midplane in contact with said peripheral surfaces; and

an annular cage bisected by said midplane and rotatably guided on said inner peripheral surface, said cage being provided with lateral projections interleaved with the rollers of both said sets, said outer race being provided at said midplane with a radial inlet bore for lubricant, said cage having an outwardly open peripheral groove wider than said bore and in continuous communication therewith, said peripheral groove registering with an end of said bore opening onto said inner peripheral surface.

4,033,647

TANDEM THRUST BEARING

John Andrew Beavers, Tulsa, Okla., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Mar. 4, 1976, Ser. No. 663,650

Int. Cl.² F16C *19/04*

U.S. Cl. 308—227 **6 Claims**

1. A tandem thrust bearing arrangement comprising:

a housing means;

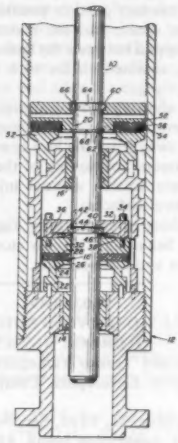
a substantially vertical shaft journaled for rotation in said housing means and having a load imposed thereon;

independently mounted lower and upper thrust bearing means operatively associated with said shaft;

said lower thrust bearing means being so constructed and arranged to carry a first part of said imposed load;

said upper thrust bearing means being so constructed and arranged to carry imposed load in excess of said first part thereof;

said lower and upper thrust bearing means permitting full loading of said shaft in a limited spacial relationship.



4,033,648

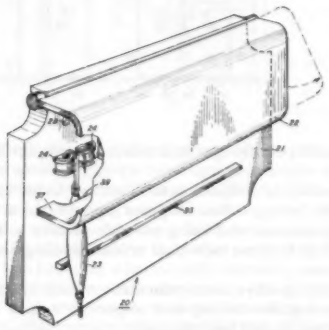
FISHING LURE RACK

Oscar E. Lopez-Cepero, 1700 Broadridge Ave., Stratford, Conn. 06497

Filed Jan. 26, 1976, Ser. No. 652,481

Int. Cl.³ A47B *67/02*; A47F *5/08*

U.S. Cl. 312—100 **2 Claims**



1. A fishing lure storage-display and holding rack for visibly mounting a plurality of lures on a supporting wall, comprising:

A. a wall-plate member incorporating mounting means for removably mounting said wall-plate member to a suitable securing wall;

B. a plurality of retaining members mounted to said plate in at least one aligned row for securely retaining portions of fishing lures, with the remainder of the lure depending vertically therefrom, with the fishing lures fully displayable;

C. a spacer bar mounted to said rack below said retaining rings and substantially parallel thereto, for maintaining the vertically depending fishing lures spaced away from said plate for easy removal therefrom; and

D. a cover member:

a. pivotably secured to said rack and movable from a first open position, exposing the retaining rings for lure removal therefrom, to a second closed position surrounding and substantially completely enclosing the barb portions of any fishing lures mounted on said plate

with the decorative portion of the fishing lure non-enclosed and fully viewable, and

b. incorporating a lower edge having

1. a lure contact portion positioned for co-operation with the spacer bar for maintaining stored fishing lures gripped between the spacer bar and the contact portion, retained on the rack in a secured position, and

2. a rack abutting portion positioned for contact with the front surface of the wall-plate member and spaced away from the lure contact portion for assuring optimum positioning of the lure contact portion for secure tension without injuring the fishing lure decorative surfaces;

whereby said fishing lures are fully displayable and securely retained on said fishing lure display storage and holding rack for both esthetics and accessability.

4,033,649
ELECTRICALLY-OPERATED SHIFTABLE ARTICLE STORAGE DEVICE

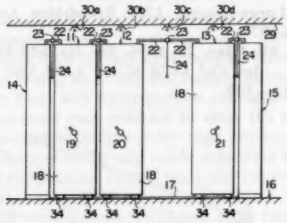
Hanichiro Naito, and Tsuneo Yamaguchi, both of Tokyo, Japan, assignors to Elecompack Company Limited, Tokyo, Japan

Filed Mar. 31, 1975, Ser. No. 563,838

Claims priority, application Japan, Apr. 2, 1974, 49-37174; Dec. 27, 1974, 50-148665

Int. Cl.² A47B *53/00*; B65G *47/00*

U.S. Cl. 312—201 **15 Claims**



1. An electrically-operated article storage device comprising

a plurality of shiftable article storage units, each of said units having a face disposed opposite to a face of an adjacent unit and being movable relative to an adjacent unit to form an individual article handling aisle therebetween;

a reversible drive motor mounted on each said article storage unit for moving said respective unit in a direction normal to said face thereof;

a control switch means disposed on each said article storage unit and interconnected to said drive motor on said respective unit for selectively rotating said drive motor in a normal direction and a reverse direction;

a regulating means disposed on each said article storage unit forming an aisle between an article storage face thereof and an article storage face of an adjacent unit facing each other on opposite sides of said aisle, each respective regulating means being operable to detect shifting movement of one of said storage units forming said aisle toward and away from the adjacent unit and being interconnected to a respective drive motor on said one unit to deactivate said drive motor in response to a movement of said one unit proximate the adjacent unit; and

confirmation switch means disposed for each said article handling aisle at a position at which the state of said article handling aisle can be readily confirmed, each said confirmation switch means being interconnected with a respective drive motor to permit activation of said motor in response to activation of said confirmation switch means, whereby shifting movement of one or more of said article storage units to form a new article handling aisle is permitted only when said confirmation switch means associated with an already existing article handling aisle is actuated.

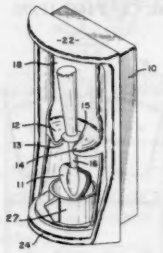
4,033,650
SANITARY BRUSH ASSEMBLY

Tacko D. Alissandratos, P.O. Box 606, Tarpon Springs, Fla. 33589

Continuation-in-part of Ser. No. 363,580, May 24, 1973, abandoned. This application Feb. 5, 1976, Ser. No. 655,568

Int. Cl.² A46B *17/00*

U.S. Cl. 312—206 **5 Claims**



1. A wall-mounted enclosure device for a sanitary brush useable in cleaning toilet bowls and the like, which comprises:

a recessed receptacle having top and bottom walls closing the ends of the receptacle;

a recessed door arranged for limited vertical movement and rotatably supported by and connected to the ends of the receptacle by an upper and a lower pivotal mounting therebetween, said door being pivotable between an open position wherein the door recess faces in the same direction as the receptacle recess, and a closed position wherein the door recess is opposed to the receptacle recess;

a single shelf rigid with said door and extending across the recess therein substantially medially thereof, said shelf defining a slot extending inwardly thereof from an outer edge of the shelf, in which the brush handle may be seated to suspend the brush from the shelf into a lower portion of the door recess;

closing spring means;

means cooperative with said receptacle for retaining the door in its open position against a closing force exerted on the door by the closing spring means, which include

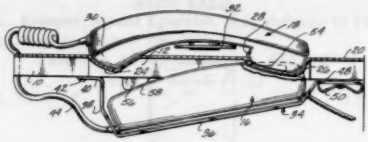
an arcuate channel defined by the bottom wall of the receptacle, facing a bottom surface of the door, and concentric with the lower pivotal mounting of the door, said bottom wall also defining a raised protrusion in the channel adjacent one end of the channel,

a slide member attached to the bottom surface of the door, arranged to slide in the arcuate channel as the door is rotated about its pivotal mountings, so that the slide member is disposed at one end of the channel when the door is open, and at the other end of the channel when the door is closed, the door being displaced upward as the slide member traverses the raised protrusion in the channel, and the raised protrusion acting on the slide member to hold the door in its open position against the force of the closing spring means until the door is manually rotated toward its closed position and the slide member again traverses the raised protrusion, whereupon the closing spring means returns the door to its closed position.

4,033,651
DESK MOUNTING FOR TELEPHONE

Albert O. England, Jr., 5225 Gould Ave., La Canada, Calif. 91011

Filed Mar. 29, 1976, Ser. No. 671,330
Int. Cl.² A47B 83/00; A04M 1/02
U.S. Cl. 312—237 2 Claims

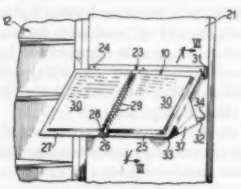


1. Apparatus for providing a desk-top mounting of a phone of the type having a cradle and handset removably resting on the cradle when not in use, the handset having a dial between the pickup and earpiece ends of the handset, the cradle having a shutoff button projecting therefrom in a position to be engaged and depressed by the handset when placed on top of the cradle, comprising a flat supporting panel adapted to be mounted flush with the desk top, the panel having an elongated opening therein, a thin plastic sheet overlying the top surface of the panel and the elongated opening, the sheet having a pair of integrally formed spaced depressions formed therein extending into said opening, the depressions being adapted to receive the pickup and earphone ends respectively of the handset, one of said depressions having a small opening through the sheet for receiving the shutoff button of the cradle, a bracket detachably secured to the underside of the panel for supporting the cradle of the phone, the bracket holding the cradle at an acute angle to the panel with the portion having the shutoff button extending up into said opening in the panel adjacent one end of the elongated opening and with only the shutoff button projecting up through the opening in the plastic sheet, whereby the handset, when positioned in said depressions, engages the shutoff button, and a positioning bar secured to the under side of said panel and extending across the elongated opening adjacent the other end, the bar having a surface engaging the top of the cradle to clamp the cradle between the supporting bracket and the bar.

4,033,652
BOOK DESK

John F. O'Brien, Downers Grove, Ill., assignor to The Mercy Hospital and Mercy Orphan Asylum of Chicago, Chicago, Ill.

Filed Dec. 8, 1975, Ser. No. 638,296
Int. Cl.² A47B 63/00
U.S. Cl. 312—245 4 Claims

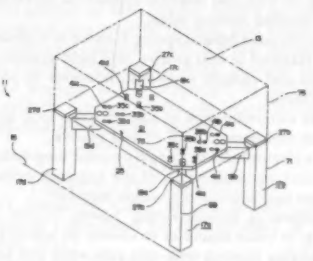


1. In a patient's supply cabinet for a hospital bedroom having doors opening to a corridor outside the room and to the interior of the room with shelves between the doors, the improvements of a patient's record book adapted to be stored on one of said shelves, said book having a side backing, front and back covers hinged to said side backing, and pages removably mounted on said side backing between said covers adapted to receive writing on both the front and back sides thereof, an elongated horizontal upwardly opening channel strip mounted on the inner face of at least one of the doors of said cabinet, a cooperating downwardly opening channel strip on both covers of the book interfitting with said upwardly opening channel strip to suspend the book from the door in an open position with the covers of the book in a flat plane for selectively supporting the front and back sides of the pages, a prop flap hinged to a cover of the book for underlying said cover and having a free end edge for engaging the door from which the book is suspended to project the book from the door in a flat planar open position for comfortable writing on both sides of the pages.

4,033,653
UNIVERSAL SPEAKER STAND

Lawrence C. Doring, and Robert E. Williams, Jr., both of Memphis, Tenn., assignors to Support Systems, Inc., Memphis, Tenn.

Filed Aug. 29, 1975, Ser. No. 609,084
Int. Cl.² A47B 91/00; F16M 11/38
U.S. Cl. 312—253 10 Claims

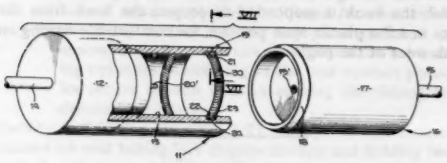


1. A stand adaptable for elevating any one of a variety of different size speaker cabinets to an optimum height above a planar supporting surface, said stand comprising a plurality of upright uniform legs having predetermined lengths commensurate with the optimum height in which the speaker cabinet is intended to be elevated above the planar supporting surface, each of said legs including a horizontally extending arm member fixedly attached thereto, said plurality of legs being arranged with said arm members thereof reaching inwardly toward one another, a horizontally disposed member engaging said arm members, each of said legs including a horizontally disposed means to establish an acme resting surface defining the upwardly directed surface of said leg for restingly engaging in a conterminous portion of the lowermost horizontal surface of the speaker cabinet, and adjustable attachment means for attaching each of said arm members to said horizontally disposed member at any one of several different locations, said adjustable attachment means including means for selectively positioning each of said legs inwardly generally towards the other of said legs and outwardly generally away from the other of said legs and for selectively positioning each of said legs in one of a plurality of positions with each of said horizontally extending arm members extending outward of said horizontally disposed member at the same angle relative to the other arm member in each of the plurality of positions and with the distance between any adjacent pair of legs being variable independently of the distance between any other adjacent pair of legs for placement of said legs in at least several positions to enable said plurality of legs to restingly support any one of a variety of speaker cabinets of different widths and legths of said lowermost horizontal surface thereof.

4,033,654
ELECTRICAL CONNECTOR

Harold B. Ross, Canoga Park, Calif., assignor to Automation Industries, Inc., Century City, Calif.

Filed July 29, 1976, Ser. No. 709,584
Int. Cl.² H01R 13/34
U.S. Cl. 339—143 R 2 Claims



1. In an electrical connector including a first connector member adapted to mate with a second connector member, the combination of:

said first connector member having a cylindrical wall including internal cylindrical surfaces,

a radially inwardly facing groove in said internal cylindrical surface,

said groove having a bottom wall of selected diameter and side walls spaced apart a selected distance;

said second connector member having an external cylindrical surface having an outer diameter to provide a close sliding fit with said internal cylindrical surfaces and having a beveled leading edge;

and a continuous helical spring formed in a closed circular loop, retained in said groove, and held against movement in axial and radially outward directions by said walls of said groove;

the outer circumference of said circular loop being seated against said bottom wall of said groove,

the inner circumference of said circular loop being less than the outer circumference of the external cylindrical surface on said second connector member,

said continuous helical spring having helical coils each having an outer diameter to closely fit within said groove with sliding contact with said side walls and bottom wall,

said continuous helical spring loop being non-compressible in an axial direction and being subject to forces in a radial outward direction when said second connector member is mated with said first connector member,

whereby said helical coils are displaced in a circumferential direction into a greater slant relation with the outer circumference of the circular loop during such mating of the connector members to close space between adjacent helical coils to provide an effective shield against RFI and EMI transmission,

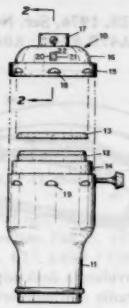
and whereby the radial outward forces acting on said helical coils during relative sliding movement of the connector members causes wiping contact of the coils with side walls and bottom wall of the group and with said external cylindrical surface of said second connector member.

4,033,655
GROUNDABLE LAMP RECEPTACLE

William Sewell, 205 Outer Drive, Oak Ridge, Tenn. 37830

Filed Aug. 30, 1976, Ser. No. 719,067
Int. Cl.² H01R 3/06
U.S. Cl. 339—14 R 5 Claims

1. An improved lamp receptacle of the type wherein a thin metallic shell and base substantially surround a socket for receiving an end of a lamp, the base being provided with a flange for releasible engagement with the shell and a domed cap terminating in a central hub attached to the flange, the improvement comprising a crimpable inwardly deformed

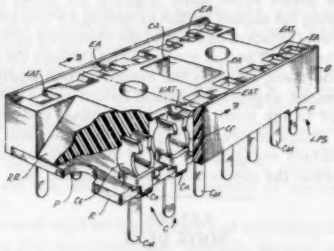


connector within the cap for receiving a ground wire, the connector being formed from a part of the cap.

4,033,656
LOW PROFILE INTEGRATED CIRCUIT SOCKET

Eugene G. Freehauf, Ontario; Gene C. Hollingsworth, Cerritos, and David Edward Welsh, Fullerton, all of Calif., assignors to Zero Manufacturing Company, Burbank, Calif.

Filed Sept. 2, 1975, Ser. No. 609,702
Int. Cl.² H05K 1/16
U.S. Cl. 339—17 CF 22 Claims



1. An integrated circuit package socket comprising

an insulative body having a plurality of spaced apart electrical contact entry apertures extending therethrough, the entry apertures being arranged adjacent opposite edges of the body for receiving an integrated circuit package with the package leads mounted in the entry apertures,

a planar insulative base member having a plurality of spaced apart contact mounting positions defined thereon and arranged adjacent opposite edges of the base member for receiving and securing an electrical contact from an adjacent side position onto each mounting position in a non-tilting relationship, and

a plurality of electrical contacts constructed and defined to be mounted on said base member from an adjacent side position onto preselected ones of said mounting positions on the opposite edges of the base member to receive the integrated circuit package leads inserted into the entry apertures at one end of each electrical contact in an electrical conducting relationship, each of the electrical contacts having a female receptacle at said one end for receiving the integrated circuit package leads and extending from one side of the said base member and a terminal portion dependent from the female receptacle and extending from the opposite side of said base member from the female receptacle and being spaced therefrom by a solid portion of the base member,

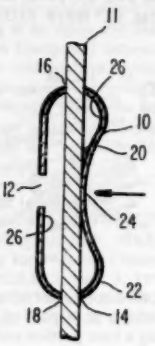
the base member mounting the electrical contacts being secured to the insulative body with only the terminal portions of the contacts extending outwardly from the secured base member and the insulative body in an exposed relationship to allow an electrical conductor to be secured thereto.

4,033,657

BUSS BARR

David C. Kemper, Mount Ephraim, N.J., assignor to The Burndette Company, Mount Ephraim, N.J.

Filed Feb. 11, 1976, Ser. No. 656,998
Int. Cl.² H01R 11/22
U.S. Cl. 339—19 **12 Claims**



1. For use with a plurality of electrical terminal posts, a buss bar comprising:

a. an elongated generally tubular body of electrically conducting material, said body defining a slot extending laterally along a side thereof;

b. said body defining a plurality of pairs of apertures, each pair of apertures including an upper hole positioned in the upper portion of said body and a lower hole position in the lower portion of said body, each of said pairs of apertures being adapted to receive therethrough an electrical terminal post to provide electrical communication between posts positioned within each pair of apertures; and

c. a pressure surface on said body extending toward the center of said body to be in abutment with the terminal posts positioned extending through the pairs of said upper and lower holes, said pressure surface adapted to laterally bias the terminal posts into full electrical contact with edges of said upper and lower holes and with said pressure surface.

4,033,658

CONNECTOR ASSEMBLY ACCEPTING DIFFERENT SIZE POST CONTACTS THEREIN

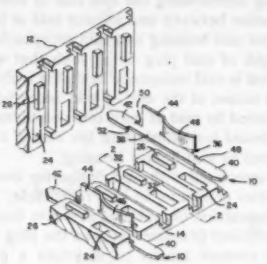
John Carl Asick, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 27, 1976, Ser. No. 661,887
Int. Cl.² H01R 13/26, 13/46
U.S. Cl. 339—32 R **1 Claim**

1. An electrical connector receptacle assembly capable of mating with a terminal pin having round, square, or rectangular section, with substantially uniform contact force being applied to said terminal pin regardless of its section, said connector assembly comprising:

a housing comprising a pair of identical mating housing members together defining therebetween a plurality of contact receiving cavities with a terminal pin receiving bore passing through each said cavity, each said bore having inwardly directed flanges at opposite ends thereof defining entrances with stepped profiles of lesser dimensions than the respective bore, a projection and a recess between each said cavity and bore mating with like projections and recesses in the opposite housing member with each projection bonded into a corresponding recess to permanently bond said housing members together; and

a contact received in each said cavity, each said contact having an elongated body portion lying within said cavity, neck means at each end of said body engaging said entrance flanges for lockingly holding said contact in said cavity, a conductor engaging solder tab portion integral with each end of said body portion and extending from each end of said bore, said solder tab being at least as wide as said body portion, and a terminal pin engaging blade portion having one end integral with and extending



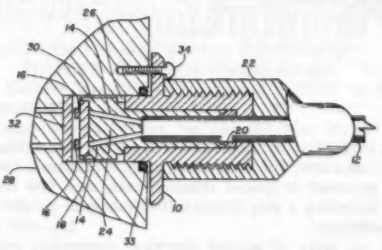
normal to said body portion and lying aligned with the broadest portion of said stepped profile for engagement with terminal pins inserted therein, said blade having an initial cantilever position in which it first engages a terminal pin and a second double beam position in which its free end engages and is supported by said housing to apply uniform pressure to the pin terminal regardless of the sectional configuration thereof.

4,033,659

UNDERWATER CONNECTOR

Louis Alpert, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 26, 1976, Ser. No. 708,505
Int. Cl.² H01R 13/52
U.S. Cl. 339—60 R **6 Claims**



1. An underwater connector for an electrical cable having at least one conductor comprising:

a hollow housing having an open end and a closed end;

said closed end having a bore hole therethrough;

a flange extending around the outer circumference of said hollow body near the open end thereof;

said flange acting to limit the penatration of said hollow body into said receptacle and also act as a retaining device to maintain said hollow body in place within the receptacle;

said cable entering said housing through said bore hole and substantially extending the length of said housing;

said at least one conductor extending through and beyond the open end of said housing;

means in physical engagement with said cable and abutting

the inner surface of said closed end of said housing for securing the cable in said housing;

a plug of deformable insulating material filling the interior of said hollow housing and extending a distance beyond the open end of said housing;

the exterior dimensions of the plug extending beyond said open end of the housing being substantially equal to the interior dimensions of said receptacle;

a circumferential slot extending around said portion of said plug extending beyond the open end of the housing and immediately adjacent the housing at the open end thereof;

said plug surrounding the one end of said cable providing insulation between and around said at least one conductor and said housing and said receptacle;

the length of said plug being such that when said plug is secured in said receptacle said plug is always compressed;

contact means at the end of said receptacle adapted to be contacted by said at least one conductor;

a plug board inset flush with the end of said plug which is external to said hollow housing;

means associated with said flange for connecting said underwater connector in said receptacle;

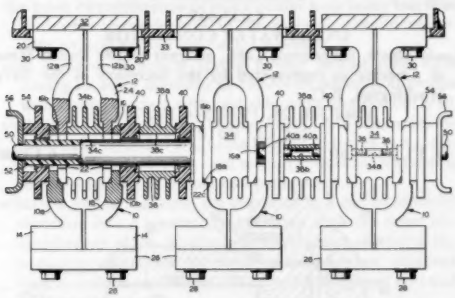
said compression of said plug acting to insure that there will be sufficient pressure between the plug board and receptacle contact means to maintain a positive electrical contact there between.

4,033,660

HIGH CURRENT ELECTRICAL JOINT APPARATUS

Eric A. Ericson, Plainville, and Frederick D. Kaufhold, Forestville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Aug. 16, 1976, Ser. No. 714,524
Int. Cl.² H01R *13/54*
U.S. Cl. 339—75 M **15 Claims**



9. Electrical joint apparatus comprising, in combination:

A. an array of first electrical connectors commonly mounted in spaced relation, each said first connector mounting a pair of contact elements in parallel spaced relation;

B. an array of second electrical connectors commonly mounted independently of said first connector array, each said second connector associated with a different one of said first connectors and mounting a pair of contact elements arranged in parallel spaced relation, the separation between the paired contact elements of each said first connector being greater than the separation between the paired contact elements of its associated second connector, whereby said contact elements of each said first connector are arranged for juxtaposition in individual lapped relation with the outer surfaces of respective contact elements of the associated second connector;

C. a heat sink mounted between said paired contact elements of each said second connector; and

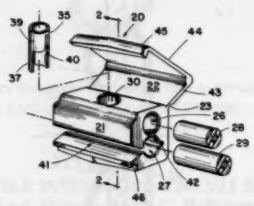
D. a joint clamping mechanism coupled with said first connector array and, upon movement of one of said connector array into juxtaposition with the other, operative to exert clamping forces effective to clamp each said contact element of each said first connector in secure electrical interconnection with the contact element of the associated second connector in lapped relation therewith.

4,033,661

SOLDERLESS CONNECTOR FOR INSULATED WIRES

Roy A. Moody, Flossmoor, and John J. Bulanda, New Lenox, both of Ill., assignors to Panduit Corporation, Tinley Park, Ill.

Continuation of Ser. No. 481,566, June 20, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,072
Int. Cl.² H01R *13/38*
U.S. Cl. 339—98 **20 Claims**



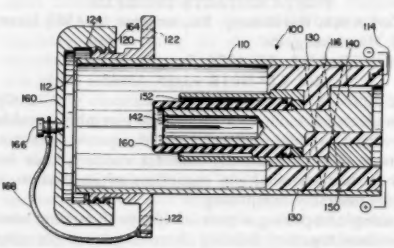
1. A self-stripping wire connector adapted for making positive electrical connection to a pair of wires comprising an insulating body having a base portion and a cover portion, one of said portions being provided with a pair of elongate wire receiving channels, each of said channels being adapted to receive an insulated wire, said one of said portions having a wall or walls defining an elongate aperture therein with its longitudinal axis intersecting each of said channels, said channels being stacked in the direction of elongation of said aperture, the wall or walls of said one of said portions define a guiding surface, and a contact element positioned in said aperture and adapted to engage each of said pair of wires for making electrical and mechanical engagement therewith, said contact element comprising first and second surfaces having an edge surface therebetween, said first surface defining an outer boundary disposed adjacent said guiding surface at points spaced on said boundary lying in non-parallel planes.

4,033,662

ELECTRICAL CONNECTOR

James W. Swiger, 1015 Heatherwood Road, Bluefield, W. Va. 24701

Filed Apr. 30, 1976, Ser. No. 681,823
Int. Cl.² H01R *3/00*
U.S. Cl. 339—113 R **5 Claims**



1. Electrical connector adapted to secure corresponding conduits of opposite polarity, comprising:

A. an elongated plug, said plug comprising an outer case wherein respective electrical contacts are housed;

A1. a cylindrical plug positive contact, set axially of the

casing, said positive contact having open and closed ends;

A2. a plug negative probe contact set within the housing interiorly of the positive contact;

B. bores at adjacent closed ends of the respective contacts and means engageable with said bores and said conduits to secure conduit sections thereto,

B1. an elongated receptacle, said receptacle comprising an outer case wherein respective receptacle contacts are housed;

B2. a cylindrical plug positive contact, set axially of the casing, said plug positive contact having open and closed ends;

B3. a receptacle negative contact, disposed generally axially of the receptacle positive contact, said negative contact having at an open end thereof an axial cavity;

C. insulating means interposed between the respective receptacle negative and positive contacts;

D. transparent potting means securing the respective receptacle and plug contacts within the respective casings and

E. polarity indicia set within the respective said receptacle and plugs, adjacent the corresponding positive and negative contacts thereof.

4,033,663

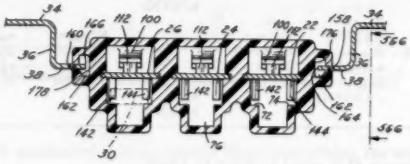
CONNECTOR BLOCK AND TERMINAL ASSEMBLY

Willard B. McCardell, Royal Oak, Mich., assignor to Altair Tool & Engineering Inc., Mount Clemens, Mich.

Division of Ser. No. 628,073, Nov. 3, 1975. This application June 4, 1976, Ser. No. 692,634

Int. Cl.² H01R *21/00*

U.S. Cl. 339—128 **7 Claims**



1. A connector block and support assembly comprising, in combination:

a support having a pair of co-planar spaced apart confronting marginal edges defining a connector block receiving space therebetween,

a connector block having means thereon for receiving and supporting an electrical terminal,

said block having opposite sides shaped to provide opposed longitudinally extending outwardly opening substantially parallel channels for slidable reception in one direction of said confronting marginal edges of the support,

and said block having locking tang means for engaging said support adjacent at least one confronting marginal edge and holding the block against reverse slidable removal on said confronting marginal edges.

4,033,664

BATTERY TERMINAL CONNECTOR

Virgil Y. Norman, P.O. Box 164, Courtland, Calif. 95615

Filed Jan. 19, 1976, Ser. No. 650,049

Int. Cl.² H01R *11/26*

U.S. Cl. 339—236 **9 Claims**

1. A battery terminal connector comprising a housing adapted to electrically contact a conductor, said housing adapted with a longitudinal opening therethrough, a spring retainer cup adapted to coaxially engage the interior of said housing at one end of said longitudinal opening, said cup having an opening therein, said spring retainer cup having a flange extending radially outwardly at one end of said opening and a lip extending radially inwardly at the other end thereof, a helical spring having an outside diameter smaller than said opening and larger than a port formed by the interior edges of said lip, a push button having one end of a longitudinal shaft fixedly secured normally thereto, the other end of said longitudinal shaft adapted with external threads thereupon, said opening having upper and lower tapered portions and an intermediate cylindrical portion, a battery terminal gripping element having a first portion of the length thereof adapted with a coaxial threaded hole within a cylindrically shaped external surface, said external threads adapted to threadingly

engage within said threaded hole, a second portion of the length of said battery terminal gripping element adjacent said first portion having an outside diameter at the free end thereof greater than the outside diameter of said battery terminal gripping element at the intersection of said first and said second portions of the lengths thereof, a battery terminal opening within said second portion of the length of said battery terminal gripping element formed by the walls thereof adapted with a plurality of notches extending longitudinally from said free end thereof, said battery terminal gripping element fabricated from a conducting material and adapted to electrically connect to said housing and said conductor.

4,033,665

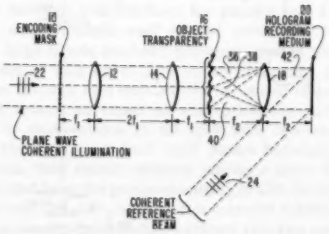
SYSTEM FOR RECORDING REDUNDANT FOURIER-TRANSFORM HOLOGRAM

Arthur Herbert Firester, Skillman, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 582,427, May 30, 1975, abandoned, which is a continuation of Ser. No. 490,501, July 22, 1974, abandoned. This application May 27, 1976, Ser. No. 690,653

Int. Cl.² G03H *1/28, 1/16*

U.S. Cl. 350—3.5 **3 Claims**



1. A system for recording a redundant Fourier-transform hologram of a two-dimensional object that exhibits a gray scale, said hologram being recorded on a given area of a

recording medium with mutually coherent reference and information beams of wave energy of a given wavelength, said system comprising:

a. illuminating means including an encoding mask positioned to simultaneously illuminate each one of respective sampled portions of said object with a corresponding one of divergent sampling components of coherent wave energy of said given wavelength,

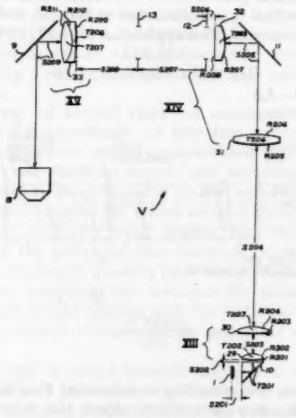
b. Fourier-transform means including a lens having at least a given diameter and a given focal length, said lens having said object in its front focal plane and said recording medium in its back focal plane for illuminating substantially all of said given area with said information beam in response to substantially the area of said lens defined by said given diameter being simultaneously illuminated by all said divergent sampling components, and

c. wherein said encoding mask includes an amplitude mask in association with a phase plate, said amplitude mask comprising a substantially regular array of apertures for deriving from each aperture a separate one of said divergent sampling components, each aperture having a predetermined shape of a predetermined size with respect to said given wavelength which is sufficiently small to diffract coherent wave energy incident thereon so that the zero diffraction order of the wave energy passing therethrough exhibits a preselected angle of divergence which subtends said given diameter at the principal plane of said lens, whereby substantially said entire lens area defined by said given diameter is simultaneously illuminated by the zero diffraction order divergent sampling component emerging from each respective aperture of said array, and wherein said phase plate includes sampling area individually corresponding to said apertures of said array to provide a uniform phase shift for any single sampling component which bears a random phase relationship with the uniform phase shift provided for any other sampling component so that for the aperture corresponding to each sampling component there exists another randomly-located aperture corresponding to a sampling component substantially 180° out of phase therewith, whereby the average amplitude transmittance of the entire encoding mask is substantially zero.

4,033,666
MICROSCOPE VERTICAL ILLUMINATOR

Arthur H. Shoemaker, East Aurora, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Division of Ser. No. 607,842, Aug. 25, 1975. This application June 28, 1976, Ser. No. 700,268
Int. Cl.² G02B 21/06
U.S. Cl. 350—91 2 Claims



1. An illumination system for vertical microscopy comprising, in alignment and sequence along an optical axis, a light source, a collector lens system, having two plano-convex positive singlets (29) and (30), a relay lens system having a double convex singlet (31), and a convex-plano singlet (32), an aperture diaphram, an iris diaphram, a double convex positive doublet (33) collimating lens and a beam splitter to direct light from said source into the rear of a microscope objective and permit light coming from said objective to pass through said beam splitter to an eyepiece, said system having the following parameters:

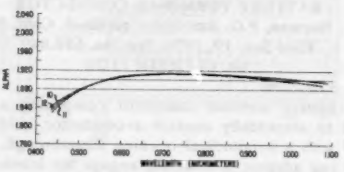
Lens	Radius (R)	Thickness (T)	Spacing (S)	Index of Refraction (ND)	Abbe No. (ν)
			S_{201}= 0.5688Q		
	Prism	T_{201}= 1.2410Q	S_{202}= 0.0000Q	ND_{201}= 1.69963	ν_{201}= 34.67
	R_{201}= ∞				
29		T_{202}= 0.2585Q		ND_{202}= 1.58904	ν_{202}= 61.23
	R_{202}= −1.3005Q		S_{203}= 1.2410 Q		
	R_{203}= ∞				
30		T_{203}= 0.2585Q		ND_{203}= 1.58904	ν_{203}= 61.23
	R_{204}= −3.3739Q		S_{204}= 14.5605Q		
	R_{205}=				
31	11.2289Q	T_{204}= 0.5171Q		ND_{204}= 1.52300	ν_{204}= 58.60
	R_{206}= −11.2289Q		S_{205}= 9.7248Q		
	R_{207}=				
32	4.0384Q	T_{205}= 0.3619Q		ND_{205}= 1.52300	ν_{205}= 58.60
	R_{208}= ∞		S_{206}= 0.5336Q		
	Diaphragm Spacings		S_{207}= 5.5843Q		
			S_{208}= 4.7053Q		
	R_{209}= 7.8243Q	T_{206}= 0.2585Q		ND_{206}= 1.78600	ν_{206}= 25.52
33	R_{210}= 4.0384Q	T_{207}= 0.5171Q		ND_{207}= 1.58904	ν_{207}= 61.23
	R_{211}= −4.0384Q		S_{209}= 9.2036Q		

wherein Q is equal to 9mm to 15mm.

4,033,667
MULTIMODE OPTICAL FIBER

James William Fleming, Jr., Fanwood, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 12, 1975, Ser. No. 612,626
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 WG 4 Claims



1. Glass transmission line for the transmission of electromagnetic radiation centering about a wavelength within the range of from 0.5 to 2.0 μm, said line comprising a core member manifesting a radially decreasing refractive index for

said radiation from the axial core composition to the peripheral core composition, together with a cladding about said core, in which the said core consists essentially of SiO_2 and at least two refractive index modifying ingredients, in which the gradient within the said core is due at least in part to a radially increasing concentration of boron oxide, B_2O_3, to an ultimate peripheral core composition which is essentially borosilicate containing from 10 mole percent B_2O_3 to 20 mole percent B_2O_3, the said gradient approximating the form:

$$n = n_1 \left[1 - 2\Delta \left(\frac{r}{a} \right)^{\alpha} \right]^{\frac{1}{2}},$$

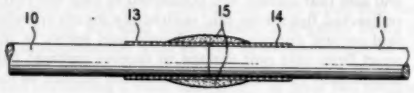
in which the n_1, is the index maximum, r is the distance from the fiber axis, a is the core radius, Δ is the relative index difference between core center and cladding and α is a power law exponent which characterizes the profile, characterized in that the said gradient is due, at least in part, to a radially decreasing concentration of phosphorous pentoxide, P_2O_5, from an axial core composition containing from 10 mole percent P_2O_5 to 15 mole percent.

4,033,668

SOLDERABLE GLASS SPLICES, TERMINATIONS AND HERMETIC SEALS

Herman Melvin Presby, Highland Park, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 8, 1976, Ser. No. 674,857
Int. Cl.² G02B *5/14*; C03C *27/02*; B23K *1/02*
U.S. Cl. 350—96 C **10 Claims**



1. A method of splicing optical fibers comprising the steps of

a. forming a first thin metallic layer having a melting point above that of solder circumferentially on the peripheral surface of a first optical fiber at least in the area immediately adjacent the end thereof to be spliced;

b. forming a second thin metallic layer having a melting point above that of solder circumferentially on the peripheral surface of a second optical fiber at least in the area immediately adjacent the end thereof to be spliced;

c. axially aligning and abutting the exposed ends of the first and second optical fibers to be spliced; and

d. applying a continuous bead of solder circumferentially around the first and second optical fiber along the joint between the first and second thin metallic layers to complete the splice.

4,033,669

PRECISION OPTICAL FIBER SWITCH

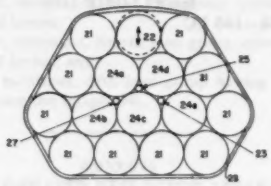
Delon C. Hanson, Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 11, 1976, Ser. No. 665,974
Int. Cl.² G02B *5/14*
U.S. Cl. 350—96 C **4 Claims**

1. An optical fiber switch having at least two positions for end-to-end coupling of optical fibers, said switch comprising:

a wiper assembly having at least three rods of substantially the same diameter and in substantially contiguous parallel relationship for retaining and aligning an optical fiber in the interspace therebetween;

a housing assembly having at least five retaining rods of substantially the same diameter and in substantially contiguous parallel relationship for retaining and aligning at least two optical fibers in the interspace therebetween, and at least ten fixed rods of substantially the same diameter and in substantially contiguous parallel relationship for retaining and aligning the retaining rods and wiper assembly;



a detent assembly including at least one rod and means for movably mounting same on the housing assembly to move in response and orthogonally to the movement of the wiper assembly as it moves from one position to another;

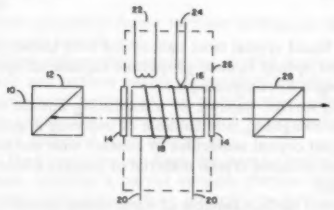
said wiper, housing said detent rods being substantially the same diameter.

4,033,670

ZEEMAN EFFECT OPTICAL ISOLATOR

George A. Tanton, and James L. Smith, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 3, 1976, Ser. No. 663,410
Int. Cl.² G02F *1/09*
U.S. Cl. 350—151 **6 Claims**



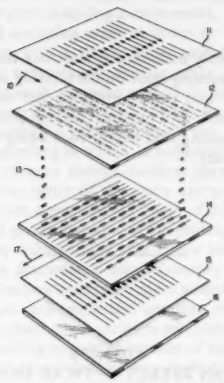
1. An optical isolator for use in a laser system having an output in the 10.6 micron or infrared range to protect the system from damage due to unwanted scattered light energy comprising: a housing having windows at each end there for propagation of a laser beam therethrough; an optical rotator disposed between said windows for passing said laser beam between said windows, said rotator containing a material having a large dipole moment; polarizing means disposed for polarization of said beam prior to and following passage of said beam through said optical rotator, means disposed adjacent said rotator to cause an absorption line around 10.6 microns in said rotator to be split into two components wherein the light from said laser passes between said two components, said rotator material having a large dipole moment selected from the group consisting of CH_3Br; CH_3F; CH_3Cl; CH_3I and CH_2CF_2, said rotator material exhibiting a high rotation and a small absorption between said two components said absorption line splitting means being a solenoid coil circumferentially surrounding said rotator whereby a magnetic field is produced in said rotator when said coil is energized and a control heater and a thermocouple to maintain frequency stability and tuning of said rotator.

4,033,671

LIQUID CRYSTAL TWIST CELLS

Dwight Winton Berreman, Westfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 26, 1975, Ser. No. 617,073
Int. Cl.² G02F 1/16
U.S. Cl. 350—160 LC 6 Claims



1. A liquid crystal twist cell device with improved interference and optical bounce properties capable of operating at a wavelength λ_v comprising:

a first surface capable of transmitting optical radiation of wavelength λ_v, and capable of inducing alignment of the liquid crystal molecules in contact with the said surface;

a layer of liquid crystal material of positive dielectric anisotropy;

a second surface capable of transmitting optical radiation of wavelength λ_v, and capable of inducing alignment of liquid crystal molecules in contact with the said second surface, the two said surfaces bounding the liquid crystal, said second surface aligned parallel to said first surface but oriented so as to align the said molecules in contact with it at an angle of approximately 90° relative to the molecules in contact with said first surface, but in a plane parallel to said molecules in contact with said first surface;

a polarization analyzer adjacent and approximately parallel to one of said surfaces;

means to align the liquid crystal molecules perpendicular to the plane of said surfaces;

the invention characterized in that

the relationship between the thickness T of the liquid crystal layer its ordinary index of refraction n_o and its extraordinary index of refraction n_e and the wavelength of the incident light λ_v is given by

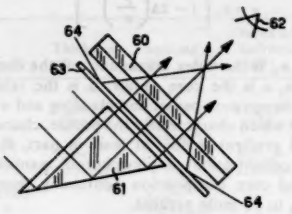
$$\frac{1}{4} \leq \frac{T}{\lambda_v} \left| \frac{n_o^2}{\sqrt{n_o^2 - 1}} - \frac{n_e^2}{\sqrt{n_e^2 - 1}} \right| \leq 1.$$

4,033,672

LIQUID CRYSTAL DEVICES

Claudio Dalmasso, Ivrea, Turin, Italy, assignor to Ing. C. Olivetti & C., S.p.A. Ufficio Brevetti, Ivrea (Turin), Italy

Division of Ser. No. 527,005, Nov. 25, 1974, Pat. No. 3,938,879, which is a continuation of Ser. No. 272,524, July 17, 1972, abandoned. This application Sept. 18, 1975, Ser. No. 614,573
Claims priority, application Italy, Nov. 24, 1971, 70842/71
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC 4 Claims



1. A liquid crystal display arrangement having a light transmissive liquid crystal display device having a front surface and a rear surface and further including:

means disposed opposite said rear surface for redirecting ambient light rays from a first direction to a second direction passing from the rear surface toward the front surface, which is opposite an observer, to illuminate said front surface from the rear surface; and

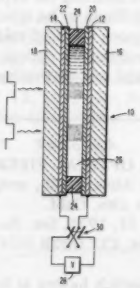
a one-way mirror disposed between said redirecting means and said rear surface and positioned to pass therethrough redirected light from said redirecting means traveling in said second direction and wherein said mirror is spaced apart from said rear surface to receive ambient light to additionally reflect same into said rear surface to further illuminate said front surface.

4,033,673

ERASABLE VISUAL IMAGE DISPLAY DEVICE

Hajime Seki, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 17, 1976, Ser. No. 686,974
Int. Cl.² G02F 1/36
U.S. Cl. 350—160 R 9 Claims



1. A visual image display device comprising:

a first and a second conductive electrode in spaced-relationship;

a cation permselective membrane on said first electrode,

an anion permselective membrane on said second electrode,

a voltage source and means for selectively applying this

voltage between the electrodes to produce an electric field; and

a normally light transmitting recording medium occupying the space between said electrodes, said medium having the properties of being both photo-ionizable and capable of electrochemically producing colored species.

4,033,674

ZOOM LENS HAVING A WIDE MAGNIFICATION VARIATION RANGE

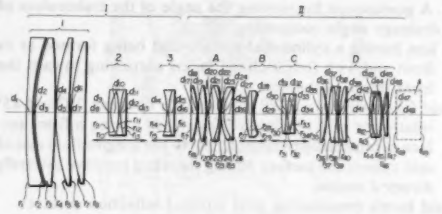
Takeshi Sekiguchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1974, Ser. No. 453,507

Claims priority, application Japan, Mar. 23, 1973, 48-33311

Int. Cl.² G02B 15/18

U.S. Cl. 350—184 9 Claims



1. A zoom lens having wide variation range, which comprises a front zoom part containing a focusing lens group, a variator lens groups and a compensator lens group said variator lens group and said compensator lens group being displaced simultaneously with as well as independently of each other, and a rear zoom part positioned behind said front zoom part and containing a fixed lens group, at least two divergent movable lens groups and a fixed relay lens group, said divergent movable lens groups being displaced simultaneously with as well as independently of each other, wherein the movable lens group of said two divergent movable lens groups placed at a position closer to the image plane is a lens group to vary the focal length while the movable lens group closer to an object is a lens group for compensation for the shifting of the image plane in the direction of optical axis.

4,033,675

WIDE ANGLE LENS

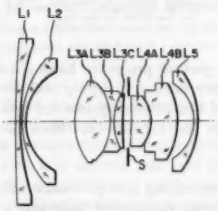
Hidenori Terasawa, and Ikuo Mori, both of Kawasaki, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Apr. 23, 1976, Ser. No. 679,687

Claims priority, application Japan, May 2, 1975, 50-52540

Int. Cl.² G02B 9/60

U.S. Cl. 350—216 10 Claims



1. A wide angle lens system comprising, in succession from the object side toward the image side:

a divergent first lens group having its surface of smaller curvature facing the object side;

a divergent, meniscus, second lens group having its convex surface facing the object side;

said first and second lens groups defining therebetween a divergent meniscus-shaped air chamber having its convex surface facing the object side;

a convergent, meniscus, third lens group consisting of a plurality of lenses;

a convergent, meniscus, fourth lens group consisting of a plurality of lenses; and

a divergent, meniscus, fifth lens group having its convex surface facing the image side.

4,033,676

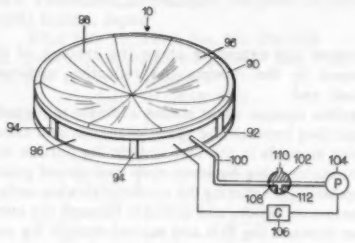
PRESSURE-SHAPED REFLECTOR APPARATUS

Lott W. Brantley, Jr., Rte. 2, Box 315A, Union Grove, Ala. 35175, and Robert W. Rood, 6510 Greenmeadow Road, Huntsville, Ala. 35810

Filed Jan. 21, 1976, Ser. No. 651,008

Int. Cl.² G02B 5/10

U.S. Cl. 350—295 12 Claims



1. A lightweight pressure-shaped reflector apparatus for use in collecting and concentrating electromagnetic radiation waves and the like to provide a concentrated source of energy comprising:

a. a hollow cylindrical frame member having an open top and an open bottom end;

b. a resilient deformable enclosure carried between said open top and bottom having an enclosed interior space;

c. said enclosure having an upper reflective surface coextensive with said open top and a lower surface coextensive with said open bottom end;

d. means for evacuating air from the interior space of said enclosure creating a partial vacuum therein deforming said upper reflective surface inwardly to form a highly reflective surface of spherical curvature; and

e. said enclosure including a side wall surface connecting said upper lower surfaces to define said interior space whereby said partial vacuum created therein causes all of said surfaces to deform inwardly.

4,033,677

PERISCOPE BLACKOUT BLIND CONSTRUCTION

Gerald Tausch, Salem, Ohio, assignor to Miller-Holzwarth, Inc., Salem, Ohio

Filed May 6, 1976, Ser. No. 683,741

Int. Cl.² G02B 5/08

U.S. Cl. 350—301 12 Claims

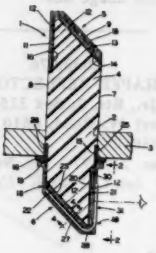
1. A periscope construction including:

a. a transparent block having eyepiece and object viewing sections located at generally opposite ends of said block, said eyepiece section having a viewing surface and a reflective surface forming an included acute angle therebetween;

b. a protective housing enclosing portions of the eyepiece viewing section, said housing having an opening aligned with the viewing surface and an angled rear wall spaced

from and extending generally parallel with the reflective surface;

c. guide means mounted between the housing and the transparent block, said guide means having a pair of spaced parallel channels with a first straight leg portion extending along edges of the housing opening, a second straight leg portion extending between the housing rear wall and the reflective surface of the block, and a curved portion integrally connecting said first and second straight leg



portions and extending about the exterior of the angle formed by the viewing and reflective surfaces of the block; and

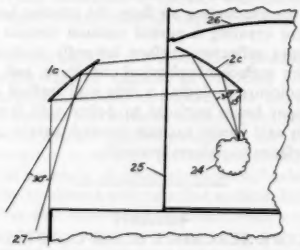
d. flexible opaque sheet means slidingly mounted on and extending between the space channels, said sheet means being movable in the first straight leg portion across the housing opening between open and closed positions for exposing and covering the eyepiece viewing surface of the transparent block, and movable through the curved portion between the first and second straight leg portions.

4,033,678

TWO-MIRROR SYSTEMS FOR PERISCOPIC REARWARD VIEWING

Milo O. Rudd, 2119 NE. 15 Terrace, Fort Lauderdale, Fla. 33305

Filed May 21, 1975, Ser. No. 579,365
Int. Cl.² G02B *5/10*
U.S. Cl. 350—302 **19 Claims**



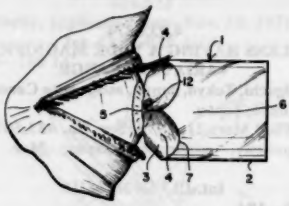
1. A periscope providing an erect and unreversed view at an intended viewing position of an extended object field and comprised of a first cylindrically concave mirror, a second cylindrically concave mirror, and means supporting and positioning said mirrors so that the cylindrical axes of both mirrors are substantially parallel and said first mirror reflects light from said object field to said second mirror and said mirror reflects light from said object field and said first mirror to said intended viewing position, wherein the distortion and astigmatism in the image of said object field as formed by reflection from said first mirror only are largely removed in said view at the intended viewing position by the reflection of said image by said second mirror.

4,033,679

GONIOSCOPE

Walter Sussman, 2260 Merrick Road, Merrick, N.Y. 11566

Filed Dec. 10, 1975, Ser. No. 639,532
Int. Cl.² A61B *3/10*
U.S. Cl. 351—16 **10 Claims**



1. A gonioscope for viewing the angle of the trabeculum of the drainage angle comprising:

a lens having a cylindrical surface and being formed at its front end with four inclined facets narrowing toward the front free end thereof,

said facets being inclined substantially between 20° and 45° relative to said longitudinal axis, and having a front surface substantially perpendicular to the longitudinal axis of said cylindrical surface having therein a concave inwardly directed recess,

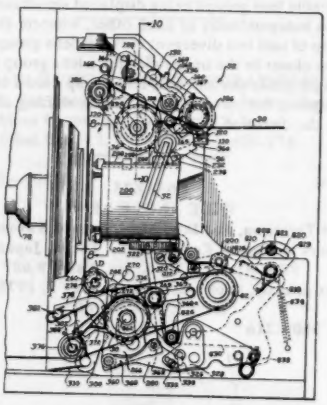
said facets constituting total internal reflection surfaces.

4,033,680

RAPID FILM REWIND MECHANISM

Vincent S. Pasturczak, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 17, 1975, Ser. No. 641,682
Int. Cl.² G03B *23/00*
U.S. Cl. 352—124 **11 Claims**



1. In a motion picture projector having a selectively operable reversible drive means, a supply reel drive, and a takeup reel drive; a rapid film rewind system for returning a projected reel of film from the takeup reel back to the supply reel, comprising:

a frame;

a takeup reel mounting arm pivoted on the frame for independent pivotal movement between a project position and a rewind position;

a rapid rewind drive means engageable between the reversible drive means and the supply reel drive to rotate the supply reel and rewind the film thereon at a substantially faster rate than during projection by the drive means; and

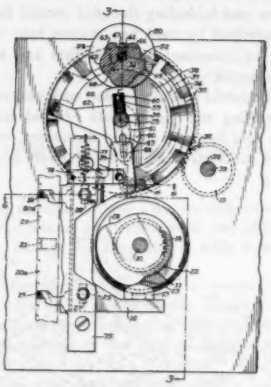
an actuator connected to said rapid rewind drive means and said takeup reel mounting arm to engage the rapid rewind drive means with the supply reel drive and including stop means to maintain the reversible drive means out of engagement therewith in response to manual movement of the takeup reel mounting arm from its project position to its rewind position.

4,033,681

FORWARD-REVERSE MULTI SPEED FILM TRANSPORT MECHANISM

Raymond W. H. Kim, Cook County, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,851
Int. Cl.² G03B 1/00
U.S. Cl. 352—173 15 Claims



1. In a motion picture projector of the type which includes a film frame aperture, a forward-reverse film transport mechanism comprising:

a drive shaft rotatable in a single angular direction;

a first cam mounted on said drive shaft and having a peripheral cam surface;

a film shuttle having at least one tooth for engaging perforations of the film;

a first follower coupled to said shuttle and communicating with said peripheral cam surface, said peripheral cam surface having a first portion for acting upon said first follower to cause said shuttle tooth to travel in a forward direction through a predetermined stroke and a second portion for acting upon said first follower to cause said shuttle tooth to travel in a reverse direction through a predetermined stroke;

a second cam rotatable about a fixed axis of rotation and having a dwelled face cam track surface comprising a plurality of concentric dwelled cam tracks, each said track including a different number of dwelled portions;

means for rotating said second cam responsive to rotation of said drive shaft; and

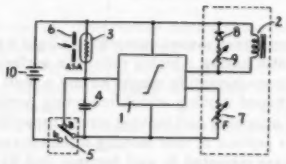
an elongated member slideably and rotatably movable about said fixed axis and having a second follower mounted thereon for changing both the direction and speed of film transportation, said second follower communicating with said shuttle and said dwelled cam face surface for causing said shuttle tooth to engage and disengage the film perforations as said second cam rotates, said second follower being arcuately displaceable about said fixed axis of rotation between a first position and a second position in response to rotation of said elongated member such that when said second follower is in said first position said shuttle tooth is caused to engage the film perforations during said forward stroke and to disengage the film perforations during said reverse stroke and when said second follower is in said second position said shuttle tooth is caused to engage the film perforations during said reverse stroke and to disengage the film perforations during said forward stroke to thereby render the direction of film transportation selectable, said second follower also being radially displaceable about said fixed axis in response to sliding movement of said elongated member for engaging selected ones of said tracks to thereby render the frequency of shuttle tooth engagement with the perforations and thus the speed of film transportation selectable, whereby both the speed and direction of film transportation is controlled by the movement of the second follower about the fixed axis of rotation of said second cam.

4,033,682

EXPOSURE QUANTITY CONTROL CIRCUIT

Yukio Nakamura, Yotsukaido; Shougo Kato, Chiba, and Shinji Nagaoka, Yotsukaido, all of Japan, assignors to Seiko Koki Kabushiki Kaisha, Japan

Filed July 15, 1975, Ser. No. 596,018
Claims priority, application Japan, July 15, 1974, 49-83556; July 15, 1974, 49-83557
Int. Cl.² G03B 9/08
U.S. Cl. 352—235 1 Claim



1. In a camera having an electric shutter operable from an initial closed state to an open state and then to a final closed state to effect an exposure: an electromagnet operable when deenergized to initiate closing of the shutter; a switching circuit connected to said electromagnet for controlling the energization of said electromagnet in accordance with preselected exposure information; and means including an adjustable exposure control circuit coacting with said switching circuit for adjustably controlling the time at which said electromagnet is deenergized such that the time period it takes said shutter from the moment of deenergization of said electromagnet to move from its open state to its final closed state substantially equals the time period it takes said shutter to move from its initial closed state to its open state, said adjustable exposure control circuit comprising a series connection of a diode and a variable resistor connected in parallel with said electromagnet to adjustably control the current flow through said electromagnet and effect deenergization of said electromagnet when the current falls below a predetermined value.

4,033,683

IMAGE VIEWING APPARATUS

Henry J. Tancredi, 9 Lamplighter Lane, Gwynedd, Pa. 19436

Filed July 14, 1976, Ser. No. 705,069
Int. Cl.² G03B 35/20, 21/56; G02B 27/22; G03B 21/28
U.S. Cl. 353—7 17 Claims

1. Apparatus for viewing an enlarged image comprising:

a housing.

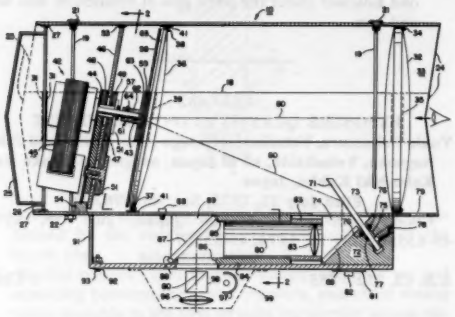
projection lens means mounted in said housing and providing an enlarged projected image of an object to be viewed

and for projecting said image along an optical path proceeding from said projection lens means,

reflective surface means mounted in said housing in said optical path proceeding from said projection means,

field lens means mounted in said housing having a front surface in said optical path proceeding from said reflective surface means and having a rear surface opposite said front surface,

moving screen means mounted for rotary movement in said housing juxtaposed said rear surface of said field lens means providing a substantially flat surface having optical embossments thereon in said optical path proceeding from said rear surface of said field lens means,



said moving screen means comprising a light weight flexible plastic disc having a highly reflective surface thereon,

moving screen mounting means having a shaft adapter and a disc shaped moving screen mounting portion,

means for attaching said moving screen mounting portion to a center portion of said moving screen means,

motor means mounted in said housing and having a rotatable shaft fixed in said shaft adapter of said moving screen mounting means, and

viewing lens means positioned in said optical path proceeding from said screen means and said field lens means for viewing an enlarged image on said moving screen means from the front of said field lens means.

4,033,684

MICROFICHE READER MEANS

Shiro Toriumi, Machida; Hiroshi Endo, Fuchu; Nobuo Ueda, Sagamihara, and Seiichi Yamagishi, Tokyo, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 6, 1975, Ser. No. 620,198

Claims priority, application Japan, Oct. 11, 1974, 49-117525

Int. Cl.² G03B *23/08*

U.S. Cl. 353—27 A **5 Claims**

1. A microfiche reader apparatus which comprises:

a frame location means including a slidable support table movable in a first direction and a carrier table movably mounted on said slidable support table and movable in a second direction which is orthagonal to said first direction;

a first pulse motor, first drive transmission means coupled between said first pulse motor and said slidable support table for moving said slidable support table in said first direction, a second pulse motor, a second drive transmission means coupled between said second pulse motor and said carrier table for moving said carrier table in said second direction;

means for inserting a microfiche having a plurality of frames in a rectangular array, said inserting means being positioned adjacent said frame location means and including a pair of microfiche detecting means in a path through which the microfiche is inserted and a transporting means for transporting the microfiche in said path and onto said carrier table, said transporting means being coupled to said detecting means and being operable to transport the microfiche only when both of said pair of detecting means are actuated by the leading end of the microfiche, said frame locating means being brought to an inserting position immediately behind said transporting means for taking in the microfiche onto the carrier table upon insertion of the microfiche;

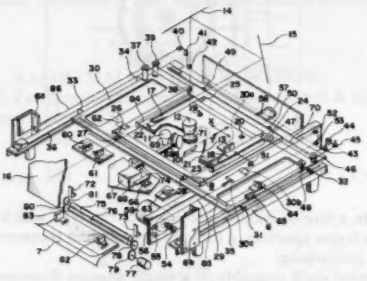
a projection means adjacent said frame location means for projecting a specific frame of the microfiche onto a screen;

a key means for specifying a specific frame of the microfiche;

control means coupled with said key means and said pulse motors for controlling the movements of said frame locating means and including decoder means for converting values specified by said key means into values corresponding to coordinates of said first and second directions, respectively;

a pair of subcontrol means coupled with said control means for controlling the movements of said frame locating means in said first and second directions, respectively;

each of said subcontrol means respectively including a first

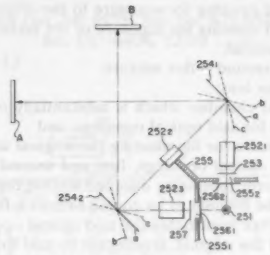


register means for memorizing one of said values corresponding to said first or second direction converted by said decoder means, a second register means for memorizing corresponding coordinate values for a previously selected frame, a subtraction circuit coupled to said first and second register means for subtracting said coordinate values stored in said first and second register for establishing a rotational direction of said first and second pulse motors, respectively, comparator means coupled to said subtraction circuit for receiving the absolute value obtained by said subtraction circuit, counter means connected to said comparator pulse emitter for emitting pulses and coupled to said counter means and to said first and second pulse motors, initiating means coupled to said pulse emitter for initiating operation of said pulse emitters for emitting pulses to said pulse motors and for initiating counting by said counter means, whereby said frame location means are moved in said first and second directions, respectively, by said pulse motors, and means coupled between said pulse emitter and said first and second pulse motors and coupld to said comparator for discontinuing the pulses to said motors when said counter means counts up to a number equal to said absolute value stored in said comparator means, whereby said frame location means is brought to rest with the specified frame at a position for projection onto the screen.

4,033,685
FILM READER

Keiichi Uno, Tokyo, and Mutsuhiro Inoue, Sagamihara, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 31, 1974, Ser. No. 537,642
Claims priority, application Japan, Jan. 12, 1974, 49-6894; Jan. 12, 1974, 49-6895; Jan. 12, 1974, 49-6893; Aug. 21, 1974, 49-95828; Aug. 30, 1974, 49-99683
Int. Cl.² G03B 23/08
U.S. Cl. 353—82 12 Claims

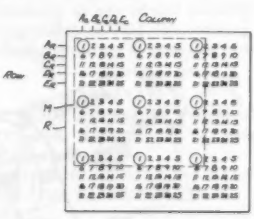


1. A film reader for observing an image recorded on film, comprising:
a screen;
a recording member having a photoconductive member and a material whose electromagnetic ray absorbing characteristics change in accordance with a voltage applied thereto;
first projection means for selectively projecting an image of the film onto either said screen or said recording member;
means for applying a voltage to said recording member to record the image of the film on the recording member; and
second projection means for projecting an image of the recording member onto said screen.

4,033,686
MICRO-IMAGE RECORDS

Adnan Waly, Stamford, Conn., assignor to Personal Communications, Inc., Stamford, Conn.

Division of Ser. No. 135,996, April 21, 1971, Pat. No. 3,704,068. This application Sept. 25, 1972, Ser. No. 291,589
Int. Cl.² G03B 23/02, 21/26
U.S. Cl. 353—120 2 Claims

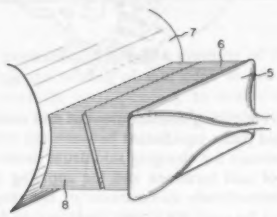


1. A microrecord comprising a record medium and a plurality of data sets formed on said medium, each data set representing a distinct page having alphanumeric and other information printed thereon and being dissected into a multiplicity of at least one thousand data sub-sets all of which are generated within a very narrow field angle along optical axes which are parallel to each other and are normal to the medium, each sub-set including at least one data bit formed by a minute portion of the information printed on said page, the sub-sets which together form a data set being dispersed on said medium according to a predetermined pattern, the dispersed sub-sets forming the plurality of data sets being interlaced with each other whereby the multiplicity of data sub-sets constituting each data set occupies a distinct position on said medium and may be optically read out therefrom along said parallel optical axes by a like multiplicity of lensettes, each having a very narrow field angle, said sub-sets being interlaced in the X- direction only.

4,033,687
CATHODE RAY TUBE PICKUP DEVICE

Kazuhiro Hirayama, Hachioji; Syusei Tsukada, Tokyo, and Takahiro Inoue, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 476,210, June 4, 1974, abandoned. This application Mar. 3, 1976, Ser. No. 663,476
Claims priority, application Japan, June 11, 1973, 48-65617
Int. Cl.² G03B 27/00
U.S. Cl. 355—1 2 Claims



1. A cathode ray tube pickup device comprising:
a photosensitive medium having a dielectric layer, a photoconductive layer and a conductive layer;
means for uniformly charging the surface of said photosensitive medium;
means for uniformly discharging the charged surface of said photosensitive medium;
an optical fiber tube disposed closely adjacent to the surface of said photosensitive medium to apply a light image to the previously charged and discharged surface thereof to form a latent image upon said surface; and
means for developing the latent image on the surface of said photosensitive medium with a liquid developer including a toner having a charge polarity for developing that portion of the latent image corresponding to the light portion of the light image, wherein the developed image is a negative of the light image.

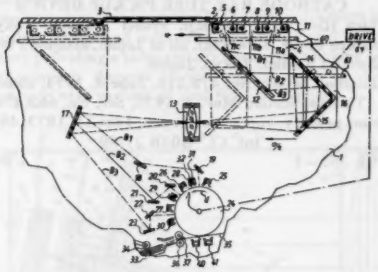
4,033,688
COLOR COPYING APPARATUS

Jürgen Orthmann, Munich, Germany, assignor to AGFA-Gevaert, Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 10, 1976, Ser. No. 656,949
Claims priority, application Germany, Feb. 14, 1975, 2506366
Int. Cl.² G03G 15/01
U.S. Cl. 355—4 9 Claims

1. A copying apparatus comprising: a housing fixedly supporting an image bearing master; a carriage on said housing displaceable at a scanning speed past said master and carrying a plurality of relatively fixed slot shutters spaced apart in the direction of displacement of said carriage; scanning means on said carriage at each of said shutters for directing therethrough a respective beam of a respective color component of the image on said master; a rotatable image drum on said housing; means for rotating said drum in a predetermined rotational sense at a peripheral velocity substantially equal to said scanning speed; a set of mirrors having an even number of mirrors aligned with each of said shutters for reflecting the respective beam along a respective path originating at said master and terminating at a respective location on said drum, the distance on said drum between said locations being equal

to the distance on said master between the corresponding path origins, each path defining at its origin with the master an angle that is substantially equal to the angle it defines at its terminus with the respective location on said drum; means for displacing one of said mirrors of each of said sets synchronously with said carriage so that said paths maintain constant length between their origins on said master and their termini



on said drum during displacement of said carriage; at least one lens in said paths equidistant between the origins and termini thereof; means for charging said drum immediately upstream of each of said locations and for applying an image former thereto immediately downstream of the respective location; and means for applying a copy sheet to said drum downstream of the respective location and for transferring the image defined on said drum by said formers to said sheet.

4,033,689

COMPACT OPTICAL SYSTEM FOR AN ELECTROSTATIC PHOTOGRAPHIC COPYING APPARATUS

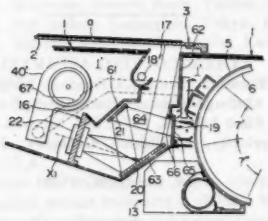
Takaji Washio, Toyonaka; Koichi Sasaki, and Tatsuo Aizawa, both of Osaka, all of Japan, assignors to Mita Industrial Company, Ltd., Osaka, Japan

Division of Ser. No. 399,516, Sept. 21, 1973, Pat. No. 3,923,391. This application Apr. 22, 1975, Ser. No. 570,426

Claims priority, application Japan, Sept. 24, 1972, 47-95460

Int. Cl.² G03G *15/28*; G03B *27/70*

U.S. Cl. 355—8 **6 Claims**



1. An electrostatic photographic copying apparatus comprising:

a frame member having a reciprocating transparent plate on which to place an original to be copied;

a rotatable photosensitive drum having an electrostatic photographic material on the periphery thereof;

a stationary optical system for projecting an image of the original placed on said transparent plate onto the surface of the photographic material as the transparent plate and photosensitive drum move relative to the optical system;

an image-forming zone disposed exteriorly of, and alongside, the periphery of said sensitive drum for forming on said sensitive material an electrostatic latent image corresponding to the image of the original or a developed image corresponding to the latent image;

a transfer zone for transferring said elctrostatic latent image or developed image to a transfer paper; and

a transfer paper forwarding system for feeding the transfer paper to said transfer zone and for forwarding the transfer paper on which said electrostatic latent image or developed image has been transferred to a discharge end through a desired treating zone from said transfer zone;

wherein the improvement resides in the optical system which includes;

an optical opening for exposure to the original;

an optical opening for exposure of the surface of the sensitive material;

first and second reflex mirrors;

one mirror lens;

an optical chamber which is substantially optically closed except for said optical openings, and

a light source for illuminating the original to be copied;

said two optical openings, first and second reflex mirrors and mirror lens being disposed so that the light reflected from the original to be copied follows a first path to said first reflex mirror through said optical opening for exposure of the original, is reflected by said first reflex mirror and follows a second path to said mirror lens, is reflected by the mirror lens and follows a third path back again to the first reflex mirror, is again reflected by the first reflex mirror and follows a fourth path across the second path to the second reflex mirror, is reflected by the second reflex mirror along a final path crossing said first path wherein the final path passes through the optical opening for exposure of the photosensitive material, thereby forming on the surface of the photosensitive material a four-fold reverse image of the desired size corresponding to the original to be copied.

4,033,690

PROCESS FOR THE PRODUCTION OR ERASURE OF DEFORMATION IMAGES AND APPARATUS FOR THE PERFORMANCE OF THE PROCESS

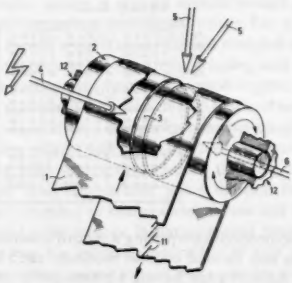
Roland Moraw, Naurod, uber Wiesbaden, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Mar. 11, 1975, Ser. No. 557,342

Claims priority, application Germany, Mar. 16, 1974, 2412771

Int. Cl.² G03G *15/00*; G01D *15/02*; G11C *11/44*

U.S. Cl. 355—9 **10 Claims**



1. In an apparatus for recording or erasing an electrostatic image by deforming a photoconductive thermoplastic layer of a recording material by heating, including support means for said recording material, charging means for charging the recording material, exposure means for exposing said material, and heating means for developing or erasing said material,

the improvement comprising groove means in said support

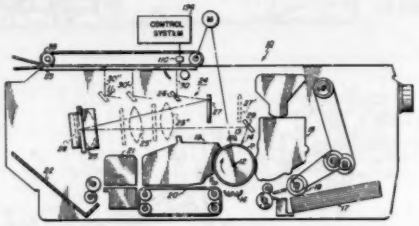
means, above which said recording material is adapted to be continuously conveyed in a self-supporting manner and is adapted to be deformed above said groove means during the recording or erasing.

4,033,691

VARIABLE MAGNIFICATION REPRODUCING APPARATUS

David P. Bierworth, Thiensville, Wis., and Thomas Lynch, Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 30, 1975, Ser. No. 627,432
Int. Cl.² G03G *15/00*
U.S. Cl. 355—11 **10 Claims**



1. In a reproducing apparatus for producing copies of a document selectively at one of a plurality of copy image magnifications comprising: a photosensitive surface arranged for movement at a given velocity; the improvement wherein said apparatus further includes:

a plurality of document viewing positions arranged along a path of travel of said document, each of said positions corresponding to a different desired copy image magnification;

means for feeding said document along said path past said viewing positions at a desired velocity corresponding to said desired copy image magnification and proportionally synchronised to the velocity of said surface;

optical means, associated with said viewing positions, for stripwise viewing said document fed by said feeding means, selectively at any desired one of said viewing positions and for projecting an image thereof onto said surface selectively at one of said plurality of magnifications corresponding to said one viewing position, said optical means comprising at least one optical element.

4,033,692

MULTI-MODE REPRODUCING MACHINE

Richard P. O'Connell, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 30, 1975, Ser. No. 627,433
Int. Cl.² G03G *15/00*
U.S. Cl. 355—14 **10 Claims**

1. In an apparatus for producing copies of a document selectively at one of a plurality of copy image magnifications comprising:

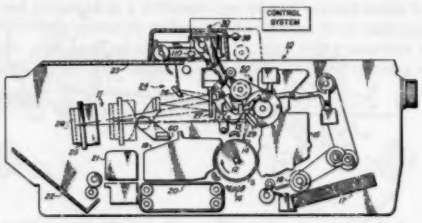
an imaging surface arranged for movement at a given velocity;

means for viewing a moving document and for projecting an image thereof onto said imaging surface selectively at one of a plurality of copy image magnifications;

feeding means for advancing said document along a path along a path past said viewing means selectively at one of a plurality of velocities corresponding to said copy image magnifications and synchronised with the movement of said imaging surface; the improvement wherein said apparatus further includes:

means arranged at a given position along said path for sensing an edge of said document at a desired position along said path, as it is advanced by said feeding means;

circuit means responsive to said sensing means sensing said edge of said document at said given position for initiating exposure of said document by said viewing means selectively after expiration of one of a plurality of time intervals following the sensing of said edge at said position, said time intervals corresponding to said copy image magnifications and said velocities of document advancement.

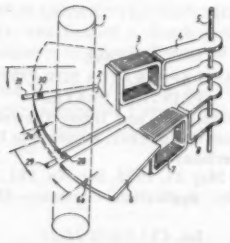


4,033,693

LIGHT INTERRUPTER

Bernd Payrhammer, Munich; Siegfried Bartel, Gauting, and Geert Besigk, Munich, all of Germany, assignors to AGFA-Gevaert, Aktiengesellschaft, Leverkusen, Germany

Filed Jan. 21, 1975, Ser. No. 542,771
Claims priority, application Germany, Jan. 24, 1974, 2403315
Int. Cl.² G03B *27/76, 9/20*
U.S. Cl. 355—71 **18 Claims**



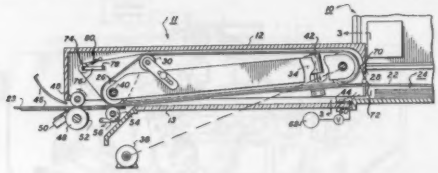
1. In an optical apparatus, particularly a photographic printer, copier, or the like, of the type in which a beam of light is caused to travel along a predetermined path in a predetermined direction, a light interrupter comprising, in combination, a light-interrupting component; a driving coil connected to said light-interrupting component; mounting means mounting said light-interrupting component and said driving coil for pivotal movement about an axis substantially parallel to the beam direction, with said light-interrupting component moving between a light blocking position and an unblocking position; a control circuit connected to said driving coil for effecting energization of said coil; and magnet means arranged to establish a magnetic field through which said driving coil moves when said driving coil pivots about said axis, with said magnetic field being oriented substantially perpendicular to the direction of movement of said driving coil.

4,033,694

COPIER DOCUMENT EJECTOR

Patrick T. Ferrari, Walworth, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 17, 1975, Ser. No. 632,426
Int. Cl.² G03B 27/64
U.S. Cl. 355—76 13 Claims



1. In a copying apparatus with a light-transmitting document copying platen and optical imaging means for copying documents through said platen, and with a document handling system for ejecting documents off from one side of said platen, wherein said document handling system comprises vacuum belt means overlying said platen for providing a document retaining air flow for transporting documents on said belt toward said one side of said platen; the improvement in said document handling system comprising:

stripping means for stripping said documents from said vacuum belt means adjacent said one side of said platen,

air jet means adjacent said one side of said platen for applying an air flow against said documents being stripped by said stripping means from said vacuum belt for counteracting said air flow from said vacuum belt means, and

including means for lifting one end of said vacuum belt means adjacent said one side of said platen for assisting the ejection of a document thereon.

4,033,695

PROCESS AND APPARATUS FOR COPYING ON PRINTING PLATES

George Sader, Bechtheim, and Dieter Osswald, Wiesbaden-Sonnenberg, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

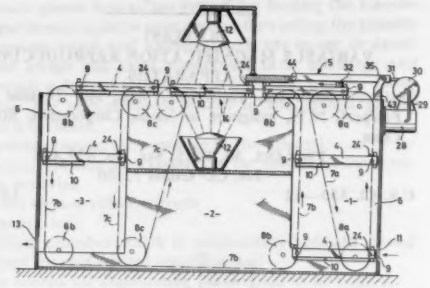
Filed May 27, 1975, Ser. No. 581,159
Claims priority, application Germany, May 29, 1974, 2426216
Int. Cl.² G03B 27/20
U.S. Cl. 355—87 22 Claims

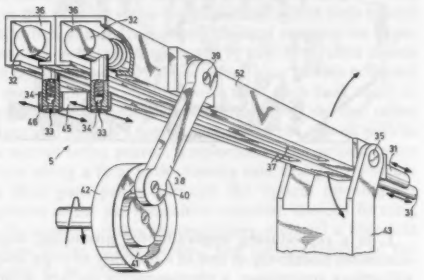
8. Apparatus for exposing light-sensitive printing plates through an original to be copied, comprising a light means for exposing said printing plate;

vacuum frame means, including an elastic blanket and a light-permeable plate adapted to be engaged with one another about the periphery thereof and form a cavity therebetween adapted to receive said printing plate and said original superimposed upon one another, with said original adjacent said light-permeable plate and light-sensitive side of said printing plate adjacent said original, to form a unitary assembly, of said vacuum frame, said printing plate and said original, separate from said light means,

means permitting the formation of a vacuum in said cavity to improve the contact between said printing plate and said original,

and support means which includes a conveyor for moving said unitary assembly into an operative position relative to said light means to expose said printing plate to light





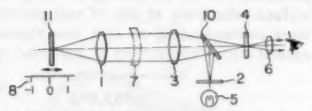
from said light means through said light-permeable plate and said original.

4,033,696

LENS METER

Masao Nohda, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Feb. 3, 1975, Ser. No. 546,750
Int. Cl.² G01B 9/00
U.S. Cl. 356—126 5 Claims



1. A lens meter comprising:

a collimator lens system in which the lens to be detected is located;

a beam splitter for dividing the optical axis of said lens system into two optical axes;

a target disposed on one of said two axes and at the focal plane of said lens system;

an indicating member on the other of said two axes and at the focal plane of said lens system; and

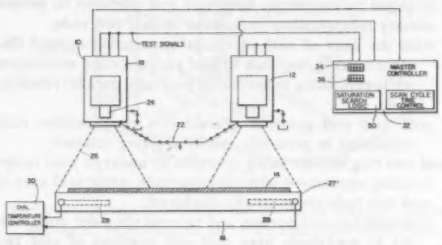
a reflecting member disposed on the opposite side of said lens system from said target to reflect the light beam passed through the lens system from said target toward said lens system, said reflecting member being movable along the optical axis of said lens system to enable said lens system to focus the reflected light beam on said indicating member and being provided with a marking on its reflecting surface; whereby, the light beam from said marking passes through said collimator lens system and

the lens to be detected once only and then reaches said indicating member, and movement of the lens to be detected in the direction perpendicular to the axis of said collimator lens system causes the image of said marking on said indicating member to be moved thereby to permit detection of th apex of the lens to be detected.

4,033,697
AUTOMATIC EXPOSURE CONTROL FOR A LUMINOUS OBJECT MONITOR SYSTEM

Ray W. Pfoutz, Sunnyvale; Karl H. Mauritz, Santa Clara, and John P. Skurla, Los Gatos, all of Calif., assignors to Reticon Corporation, Sunnyvale, Calif.

Filed May 17, 1976, Ser. No. 686,697
Int. Cl.² G01J *1/20*; G01B *11/00*, *11/04*
U.S. Cl. 356—160 **14 Claims**



1. Apparatus for monitoring a light emitting workpiece by sensing the intensity of lumination given off by the workpiece, the apparatus comprising electronically scanned photo detection means for sensing the level of lumination emitted over a predetermined area of the workpiece and for producing a video output signal representative thereof, the photo detection means having a predetermined dynamic exposure range which is electronically variable as a function of the time duration to complete one scanning cycle, means responsive to a predetermined parameter of the video signal for determining if the intensity of the lumination of the workpiece extends outside of the range of the photo detection means and for producing an exposure control signal, and scan control responsive to the exposure control signal for varying the time required to complete one scanning cycle of the photo detection means to shift the dynamic exposure range of the photo detection means to include the level of intensity of the lumination from the workpiece.

4,033,698
APPARATUS FOR TEXTILE COLOR ANALYSIS

Herbert M. Demsky, Wappingers Falls; Einar S. Mathisen, Poughkeepsie; Paul A. Schumann, Jr., Wappingers Falls, and Alvin H. Tong, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

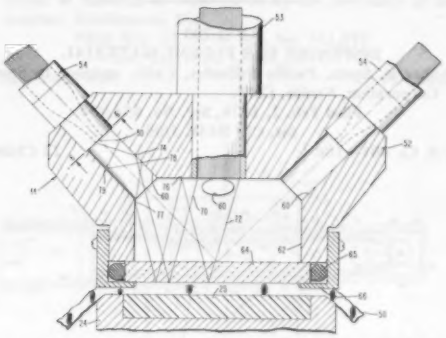
Filed Oct. 10, 1975, Ser. No. 621,335
Int. Cl.² G01J *3/46*
U.S. Cl. 356—173 **5 Claims**

1. In apparatus for analyzing the color of a textile sample, the combination comprising:

a housing of opaque material having a flat side, a cylindrical chamber therein opening through said flat side, a first cylindrical bore intercepting said chamber at a point opposite to said opening and extending substantially perpendicular to said opening, and a plurality of second cylindrical bores intersecting said chamber along the walls thereof, said second bores having axes that converge substantially to a point coincident with an extension to the axis of said first bore, the walls of said chamber and said first and second bores being blackened to minimize reflectance therefrom;

a first fiber optic bundle having one end mounted in said first bore, the other end being operative to receive light for directly illuminating a test sample positioned against said housing at said opening;

a plurality of second fiber optic bundles each having one end mounted in a different one of said second bores for receiving primarily diffuse light reflected from said sample, said ends of said second bundles being recessed in said second bores and located relative to said opening so



that the only direct specular rays received by such ends are rays that have been reflected at least twice from said housing;

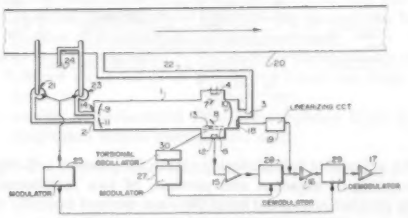
a transparent glass plate mounted in said housing and covering said opening and providing a reference surface located a fixed distance from said ends of said fiber optic bundles;

and support means adapted to press said test sample against said glass plate with a pressure in a range wherein the reflectance of said sample remains substantially constant with limited changes in pressure.

4,033,699
VAPOR CONCENTRATION MONITOR

John G. Bayly, and Ronald J. Booth, both of Deep River, Canada, assignors to Atomic Energy of Canada Limited, Ottawa, Canada

Filed May 30, 1975, Ser. No. 582,183
Claims priority, application Canada, Aug. 1, 1974, 206124
Int. Cl.² G01N *21/26*
U.S. Cl. 356—205 **8 Claims**



1. An apparatus for monitoring air from a predetermined area to determine the concentration of HDO in excess of normally occurring HDO concentration in air, comprising:

chamber means having an air inlet means and an air outlet means;

means for alternately driving the predetermined area air and the normal air into the chamber means through the air inlet means, at a first frequency;

means for producing a beam of radiation along a predeter-

mined path in the chamber means, the radiation beam bandwidth alternating between a bandwidth coincident with at least one narrow absorption bandwidth of HDO and a bandwidth non-coincident with an absorption bandwidth of HDO at a second frequency greater than the first frequency;

detector means located on said predetermined path for detecting the intensity of said beam; and

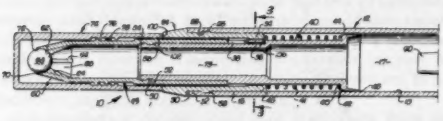
indicating means connected to said detector means for providing an indication of the excess concentration of HDO as a function of radiation absorption.

4,033,700

DISPENSER FOR FLUENT MATERIAL

Walter B. Spatz, Pacific Palisades, Calif., assignor to Spatz Corporation, Venice, Calif.

Filed Feb. 2, 1976, Ser. No. 654,034
Int. Cl.² B43K *5/06*
U.S. Cl. 401—180 **22 Claims**



1. A dispenser for fluent material comprising:

a container for storing fluent material to be dispensed;

a dispenser member slidably disposed in said container, said dispenser member having a discharge outlet;

follower means in said container movable in a forward direction toward said discharge outlet;

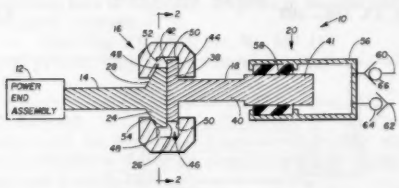
resilient means engaging and normally urging said dispenser member rearwardly in said container to pressurize fluent material in said container between said follower means and said discharge outlet, and means for shifting said dispenser member forwardly in said container to energize said resilient means.

4,033,701

CLAMP — SELF ALIGNING

Harold S. Labyer, and James C. Dodson, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Apr. 8, 1976, Ser. No. 674,693
Int. Cl.² B25G *3/00*
U.S. Cl. 403—13 **2 Claims**



1. An adjustable self centering clamp for positive self-aligning coupling of adjacent end portions of two reciprocative rods in parallel alignment with the axes thereof laterally displaced, said clamp comprising:

an outwardly tapered shoulder, on said adjacent end portion of one of said rods and facing away from an adjacent end thereof,

a first flat transverse end surface means, on said adjacent end portion of said one of said rods, for allowing lateral movement of the rods relative to one another while maintaining a positive coupling force on the rods;

a second flat transverse end surface means, on said adjacent end portion of the other of said rods, disposed in laterally slidable abutment with said first flat transverse end surface means;

a flat radial shoulder perpendicular to the axes of said other of said rods on said adjacent end portion of said other of said rods and facing away from an adjacent end thereof;

at least two ring sectors each having a radially inward facing recess having first and second walls and a bottom, said first wall having a tapered portion conforming to said tapered shoulder and said second wall having a radial surface conforming to said radial shoulder; and

connector means positioning said ring sectors about said end portions with said second wall slidably abutting said radial shoulder and for thereafter adjustably forcing said first wall to slide inwardly along said tapered shoulder whereby said radial shoulder is forcibly held in non-slidable contact which said second wall;

said two ring sectors being operable, when engaged with said end portions of said two reciprocative rods and with said first and second transverse end surfaces slideably engaged to cooperate with said end portions to permit unitary reciprocative movement of said two rods,

with the axes of said two rods undergoing mutual displacement in response to said reciprocating movement while remaining in mutually, generally parallel relation, and

with said end portions of said two reciprocative rods remaining in generally axially abutting relation;

said two ring sectors being operable to undergo joint reciprocating movement with said two rods, while said axes of said two rods are mutually displaced,

with said tapered portion and tapered shoulder cooperating to wedgingly urge said end portions of said two reciprocative rods into a relatively mutually immobilized condition with said axes thereof being mutually displaced;

said first flat transverse end surface and said second flat transverse end surface being alternately subjected to pushing and pulling forces during said reciprocating movement and being mutually displaceable, generally transversely of said reciprocating movement and in response thereto, to effect said mutual displacement of said axes of said two rods during, and in response to, said reciprocating movement; and

said two ring sectors remaining substantially centered in relation to said one of said rods and said outwardly tapered shoulder thereof during said mutual displacement of rod axes, while said other of said rods and said flat radial shoulder thereof are laterally displaced relative to said two ring sectors during and in response to said reciprocating movement as permitted by relatively reduced frictional engagement between said first and second flat transverse end surface means existing while said end surface means are slidably engaged prior to said relative immobilizing of said axes of said rods.

4,033,702

ASSEMBLIES FOR SEALING ROADWAY CURB GAPS AND METHOD OF SEALING SAME

John C. Moerk, Jr., Buffalo Grove, Ill., assignor to Felt Products Mfg. Co., Skokie, Ill.

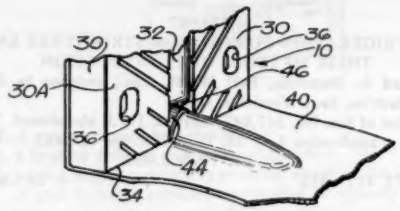
Filed Aug. 7, 1975, Ser. No. 602,684
Int. Cl.² E01C *11/02*
U.S. Cl. 404—69 **16 Claims**

1. An assembly for sealing the intersection of curb and gutter portions of adjacent roadway slabs comprising elongate parallel, spaced-apart side pads having front and rear surfaces and first and second ends, an elongate flexible joint membrane having a pre-formed, self-sustaining, upstanding arched configuration and sealingly joining said side pads, and having front and rear surfaces, and an expansive flexible sealing flap sealingly secured to said side pads and to said joint membrane for sealing a gap between curb and gutter portions of adjacent roadway slabs and for promoting controlled folding of the

sealing flap at the region where angular transition from the plane of the curb to the plane of the gutter occurs, and

said joint membrane terminating a distance from said first ends of said side pads equal at least to about the thickness of said side pads,

said flexible sealing flap extending away from said side pads and being substantially more flexible than is said joint membrane, said sealing flap comprising a main body portion which is relatively limp and a rigidified portion providing a self-sustaining, upstanding arched control zone, which control zone is substantially more rigid than the relatively limp main body portion of said sealing flap, said control zone commencing at about said first ends of said side pads and extending away from said first ends a distance equal to at least about the thickness of said side pads,



said control zone, when said side pads and flap are generally coplanar, extending in line with said joint membrane,

said joint membrane being connected to said control zone by an intermediate relatively limp flexible portion of said main body which is substantially more flexible and less rigid than is said control zone and than is said joint membrane,

whereby when said side pads and joint membrane are folded upwardly out of the plane of said sealing flap and relative to said sealing flap to position the upwardly extending portion of the joint membrane over said control zone, said control zone promotes controlled folding of said intermediate portion neatly between said joint membrane and said control zone and said control zone becomes disposed in the area between said side pads and beneath said joint membrane, and without bunching and wrinkling of said intermediate portion.

4,033,703

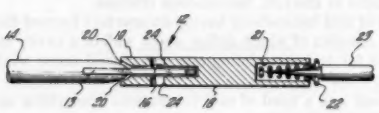
DRILL BIT FOR COUPLING TO A WIRE FISHING ADAPTER

Don Slater, 2542 Balfour, Fullerton, Calif. 92631

Filed Dec. 5, 1974, Ser. No. 529,627

Int. Cl.² B23B *51/08*

U.S. Cl. 408—211 **6 Claims**



1. A device for boring a passageway through a wall, or the like, and for fishing a wire through said passageway, comprising:

a. A drill having a blade-type drill bit;

b. At least one pin fixedly secured to and protruding from one of the two relatively broad faces of said blade-type drill bit;

c. A rod having an axially-disposed passageway in one end and a pair of axially-extending fingers in the other end, said fingers being spaced-apart a distance slightly greater than the thickness of the edge of said blade-type drill bit and having a journal in at least one of said fingers for pivotally capturing said pin; and

d. Wire coupling means disposed in said rod passageway and anchored to said rod for removably coupling said wire to said rod.

4,033,704

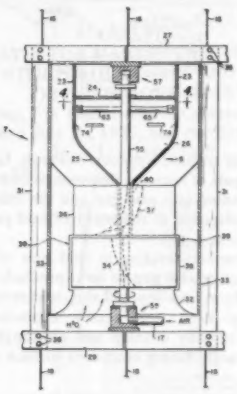
DESTRATIFICATION DEVICE

James C. Wadge, Golden; Henry T. Falvey, Conifer, and Perry L. Johnson, Lakewood, all of Colo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Nov. 11, 1976, Ser. No. 741,075

Int. Cl.² F04B *17/00, 37/10*

U.S. Cl. 415—80 **12 Claims**



1. A destratification device for controlling water quality parameters in a body of water, which device comprises, in combination:

an elongated hollow open ended outer housing;

an elongate shroud having a smooth outer surface and an interior, mounted in the housing plenum;

means for supporting the housing and shroud in a substantially vertical position within the body of water with their lower ends spaced from the bottom thereof;

a rotatable drive shaft having a hollow portion disposed coaxially within the center of the shroud and in fluid communication with its plenum;

reactive propulsion arm means mounted on said shaft and operable by pressurized fluid flowing through the hollow portion of the shaft; for rotating said shaft;

impeller means carried by the shaft for moving water axially around the exterior of the shroud when the shaft is rotated; and

a source of pressurized fluid for supplying fluid to said propulsion means through said shaft.

4,033,705

BLADE RETAINER ASSEMBLY

George W. Luebering, Cincinnati, Ohio, assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 26, 1976, Ser. No. 680,067

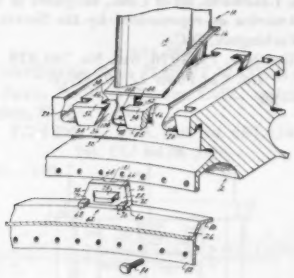
Int. Cl.² F01D *5/32*

U.S. Cl. 416—220 R **8 Claims**

1. A blade retaining assembly for locking radially extending blades in a rotor disc associated with a gas turbine engine,

each blade having a dovetail tang at its radially inward end and the rotor disc having dovetail slots extending axially across its periphery, each dovetail tang being received in one of said slots, said assembly comprising:

a pair of lugs axially extending from one side of said disc and disposed adjacent said slot and circumferentially spaced apart from each other to form an access gap for insertion of said blade tang into said dovetail slot, said pair of lugs having at least one radially inwardly facing abutment surface;



a pair of axially aligned opposed inwardly facing recesses, one of said pair of recesses disposed in one of said pair of lugs and opening into said gap and the other of said pair of recesses disposed in the other of said pair of lugs and opening into said gap;

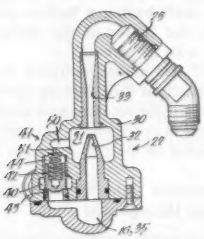
a retaining member residing in said pair of recesses and extending across said gap so as to preclude egress of said blade tang from said dovetail slot, said retaining member including at least one axially extending protrusion adapted to radially overlap and abuttingly engage said radially inwardly facing abutment surface on said pair of lugs.

4,033,706

FLUID DELIVERY SYSTEM WITH A JET PUMP BOOSTER AND MEANS TO MAINTAIN A CONSTANT RATE OF FLOW THROUGH THE JET NOZZLE

John G. Schaefer, and Terry L. Whitesel, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Aug. 6, 1975, Ser. No. 602,240
Int. Cl.² F04B *23/04*; F04F *5/48*
U.S. Cl. 417—79 **18 Claims**



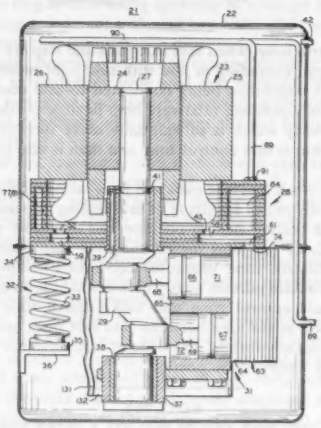
1. A fluid delivery system for delivering fluid from a tank including a positive displacement pump having an outlet connected to a discharge line, fluid flow control means in said discharge line for varying the rate of fluid delivered by the system, an ejector pump upstream of the positive displacment pump for delivering fluid to an inlet of the latter pump from the tank and having a nozzle, means including a fluid line connected between said discharge line and said nozzle for directing a part of the fluid delivered by the positive displacement pump to said nozzle, and a valve separate from said fluid flow control means and having an inlet connected to said fluid line and operable to maintain a uniform rate of fluid flow through said fluid line to said nozzle, and said valve including means responsive to the rate of flow through said nozzle for control of valve operation to maintain said uniform rate of fluid flow.

4,033,707

REFRIGERATION COMPRESSOR STRUCTURES AND THEIR METHODS OF CONSTRUCTION

Howard A. Stutzman, Fort Worth, Tex., assignor to Atlas Industries, Inc., Woodville, Ohio

Division of Ser. No. 347,847, April 4, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,463
Int. Cl.² F04B *21/00*
U.S. Cl. 417—312 **24 Claims**



1. In an integral motor and compressor comprising a base suporting a motor stator, a motor rotor, a compressor head, a valve assembly, a compressor block and a compressor crankshaft the improvement which comprises:

said base being constructed from at least three planar laminations in stacked, face-to-face relation;

a first of said laminations having an aperture formed therein the margins of which define a side wall of a cavity in said base for accommodating one end of said stator windings and rotor;

a second and a third of said laminations comprising an end wall for said cavity;

a low-pressure gas inlet passage integral with the end wall of said cavity and in circumferential alignment with said stator and rotor;

an array of low-pressure gas inlet ports through the end wall of said cavity and in communication with said inlet passage;

a low-pressure outlet port in communication with said inlet passage and through the end wall of said base abutting said compressor head; and

an intake manifold passage in said compressor head connected between said valve assembly and said low-pressure gas outlet port.

4,033,708
ROTARY COMPRESSOR

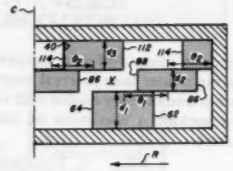
Roger C. Weatherston, Williamsville, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Continuation-in-part of Ser. No. 501,034, Aug. 28, 1974, Pat. No. 3,941,521. This application Jan. 30, 1976, Ser. No. 654,138

The portion of the term of this patent subsequent to Mar. 2, 1993, has been disclaimed.

Int. Cl.² F04C *13/00, 17/10*

U.S. Cl. 418—9 33 Claims



2. A rotary compressor, comprising:

a. a housing defining two working chambers,

b. mating impellers rotatably mounted about an axis in each of said working chambers for rotation in opposite directions,

c. each impeller having at least two profiles each of constant cross-section in planes perpendicular to said axis,

d. each of said profiles comprised of at least one lobe and at least one well, each well and each lobe being joined by a transition surface,

e. an outlet communicating with said housing,

f. means for supplying fluid at inlet pressure to the wells of each profile during portions of the rotation cycle of each impeller, whereby in one rotational position of said impellers at least one well of each profile on each impeller contains trapped fluid at inlet pressure,

g. at least one of said profiles being out of the plane of said outlet and at least one of said profiles being adjacent said outlet and

h. the lobes and wells of any one profile being angularly displaced from those of the profiles immediately adjacent thereto thereby defining in said one rotational position a common volume of trapped fluid extending from said profile adjacent said outlet to the profile most remote therefrom whereby as said impellers continue to rotate from said one rotational position said common volume is sequentially reduced by the transfer of trapped fluid from the wells of said most remote profile to said adjacent profile with the wells of said most remote profile being substantially exhausted of fluid as the wells of said adjacent profile are exposed to said outlet.

4,033,709
MOLDING APPARATUS FOR RIBBED PRODUCT

Karl Kristian Kobs Kroyer, Copenhagen, Denmark, assignor to Karl Kroyer St. Anne's Limited, Bristol, England

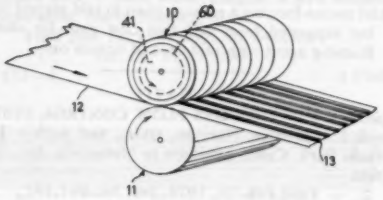
Filed July 7, 1975, Ser. No. 593,189

Claims priority, application United Kingdom, July 4, 1974, 29652/74; July 27, 1974, 33263/74

Int. Cl.² B29C *15/00*

U.S. Cl. 425—224 15 Claims

1. Apparatus for moulding ribs, ridges, studs and other upstanding projections on a mouldable material comprising a mould having an endless shaping surface and having a plurality of flexible protrusions defining therebetween at least one moulding cavity defined by the adjacent faces of the protrusions, the adjacent faces being movable when the protrusions



are deformed by pressure for reducing the size of the cavity and for compacting any mouldable material therein.

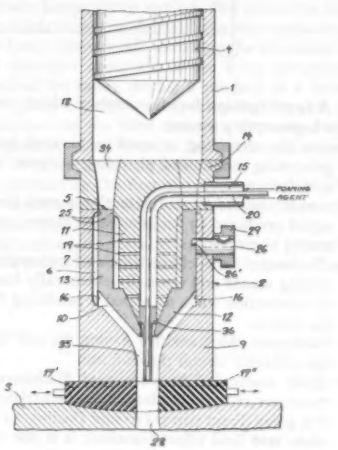
4,033,710
APPARATUS FOR MAKING THERMOPLASTIC ARTICLES WITH POROUS CORES AND LESS POROUS OR NONPOROUS SKINS

Robert Hanning, Via Tagliaferri 15, Campione d'Italia, Italy

Filed July 25, 1975, Ser. No. 599,055

Int. Cl.² B29D *27/00*

U.S. Cl. 425—543 9 Claims



1. An apparatus for making thermoplastic articles with a highly porous part integrally adjoining a part of low to zero porosity, comprising:

a mold having a cavity provided with a gate;

a nozzle having a sprue communicating with said gate and an entrance port remote from said sprue, said nozzle being provided with a ring space between said port and said sprue and and entrance port remote from said sprue;

injection means connected to said port for introducing a flowable thermoplastic material through said sprue and gate into said cavity;

flow-dividing means in said nozzle forming a first and a second path between said port and said sprue, thereby splitting said material into a first stream and a second stream merging with each other in said gate, said flow-dividing means comprising an annular member axially movable in said ring space and defining therewith an outer clearance forming part of said first flow path and an inner clearance forming part of said second flow path, said ring space being bounded by walls coacting with confronting surfaces of said annular member for adjustably obstructing the flow of said material through said

clearances, said annular member being provided with externally operable actuating means for axially displacing same; and

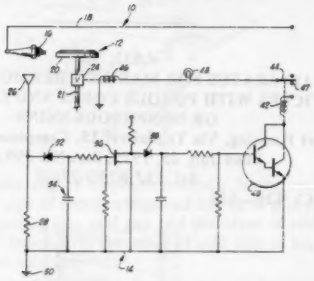
inlet means forming a passage open to said second flow path but separated from said first flow path for admixing a foaming agent with said second stream only.

4,033,711

SPARK IGNITION GAS FLOW CONTROL SYSTEM

Joseph C. Christian, Norman, Okla., and Arthur J. Steele, Menlo Park, Calif., assignors to Metrodata, Inc., Norman, Okla.

Filed Feb. 25, 1976, Ser. No. 661,297
Int. Cl.² F23Q *3/00*
U.S. Cl. 431—66 **7 Claims**



1. A spark ignition fuel flow system which comprises:

spark-generating means;

means for detecting a spark generated by said spark-generating means and providing a signal in response to said detection;

means connected to said detection means for amplifying a signal produced by said detection means, said amplifying means comprising:

an N-channel field effect transistor connected to said detecting means and normally electrically biased to a state of conduction when no signal is produced by said detecting means;

a Darlington pair transistor having the coil of said relay in the collector circuit thereof; and

a diode connected between said N-channel field effect transistor and said Darlington pair transistor to pass positive going direct current to said Darlington pair transistor when said field effect transistor is in the nonconducting state;

a fuel burner adjacent said spark-generating means for delivering combustible fuel to a situs for ignition by a spark generated by said spark-generating means; and

fuel flow control means connected to said amplifying means for permitting fuel to flow to said burner in response to an amplified signal developed by said amplifying means.

4,033,712

FUEL SUPPLY SYSTEMS

Scott A. Morton, Laramie, Wyo., assignor to Edmund D. Hollon, Douglas, Wyo., a part interest

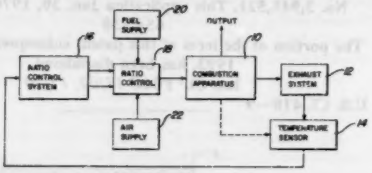
Filed Feb. 26, 1976, Ser. No. 661,629
Int. Cl.² F23H *3/00*
U.S. Cl. 431—90 **12 Claims**

1. In a combustion apparatus having an exhaust system, a fuel supply system and an air supply system, the improvement comprising:

varying means responsive to control information for adjusting in either direction the ratio of fuel to air supplied to said apparatus;

detecting means responsive to the atmosphere within the combustion system for sensing the temperature of the combustion resultant and developing a temperature signal having a value proportional to said temperature;

means for successively comparing a first sample of said temperature signal developed during a first time interval



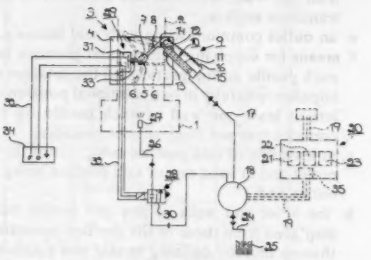
with a second sample of said temperature signal developed during a later time interval to produce said control information and thereby enable said varying means in the direction seeking a maximum of combustion-produced temperature.

4,033,713

SAFETY DEVICE FOR BUTTERFLY DAMPERS

Sven Arne Nilsson, Hassle 12, S-240 36 Stehag, Sweden

Filed Aug. 21, 1975, Ser. No. 606,527
Claims priority, application Sweden, Apr. 24, 1975, 7504738
Int. Cl.² F23N *3/00*
U.S. Cl. 431—153 **2 Claims**



1. A safety device for an oil fired central heater having a butterfly damper mounted in the flue duct of the heater, said heater including burner means, pump means for pumping oil to said burner means, and control means for actuating said pump means, said safety device comprising:

hydraulic means connected with said butterfly damper for operating the same, said hydraulic means being arranged to open said damper when operating fluid under pressure is supplied thereto, and to close said damper when the pressure of said operating fluid is relieved;

first conduit means connecting said pump means with said hydraulic means, whereby oil is transmitted to said hydraulic means under pressure when said pump means is actuated, said oil serving as the operating fluid for said hydraulic means;

second conduit means connecting said pump means with said burner means, and including a normally closed magnetic flow control valve;

position indicator means carried by said butterfly damper;

normally open switch means arranged to be closed by said position indicator means when said butterfly damper is open, and to open when said damper moves from said open position; and

an electrical circuit connecting said normally open switch means with said normally closed magnetic flow control valve, and arranged to supply electric current to said magnetic valve for opening the same to allow oil to flow to said burner means, only when said butterfly damper is

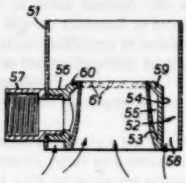
open whereby said position indicator means is effective to close said normally open switch means.

4,033,714

GASEOUS FUEL BURNERS

Alfred Longworth, Wembley, England, assignor to Radiation Limited, London, England

Division of Ser. No. 350,780, April 13, 1973, Pat. No. 3,897,198. This application May 5, 1975, Ser. No. 574,523
Claims priority, application United Kingdom, Apr. 17, 1972, 17691/72; Oct. 18, 1972, 47926/72
Int. Cl.² F23D *13/40*
U.S. Cl. 431—354 19 Claims



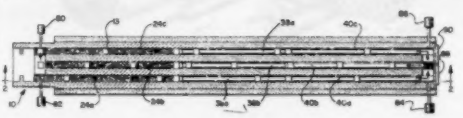
1. A mixer device for mixing first and second fluids, the device comprising a hollow vessel having two open ends and a longitudinal axis and comprising in combination first and second tubular members nested together to form the vessel, one of said members having a surface with a plurality of grooves each of which lies in a direction that is both tangential to a cylinder drawn about said axis and inclined towards one end of said vessel, the other of said members having a surface that coacts with said grooved surface to form a plurality of inlets into said cylinder for said first fluid whereby said first fluid is directed into said vessel with a helical motion about said axis and directed towards said one end of said vessel whereby a low pressure zone is created within the helix to draw said second fluid into said vessel via the other end thereof.

4,033,715

HEAT PROCESSING SYSTEM

Jacob Howard Beck, Waban, Mass., assignor to BTU Engineering Corporation, North Billerica, Mass.

Filed Jan. 12, 1976, Ser. No. 648,538
Int. Cl.² F27D *3/06*
U.S. Cl. 432—4 4 Claims



1. For use in a furnace having a high heat section to which exposure of a product must be limited, a lower temperature section contiguous with said high heat section for passage of a product along a common axis through said high heat section and said lower temperature section, first conveyor apparatus in said high heat section for transporting a product in a forward direction therethrough, second conveyor apparatus in said high heat section for transporting product carriers in a reverse direction therethrough, third conveyor apparatus in said lower temperature section for transporting a product in a forward direction through the lower temperature section and fourth conveyor apparatus in the lower temperature section for transporting product carriers in a reverse direction through the lower temperature section, and means for transferring the product carriers on the third conveyor apparatus at the end of the lower temperature section to the associated end of the fourth conveyor apparatus of the lower temperature section, a method for safely storing a product in a furnace during an emergency condition comprising the steps of:

moving a product on the third conveyor apparatus of the lower temperature section to the fourth conveyor apparatus of the lower temperature section;

moving the product on the first conveyor apparatus of the high heat section to the third conveyor apparatus of the lower temperature section; and

stopping said conveyor apparatus to retain said product in the furnace only within the lower temperature section.

4,033,716

TRANSFER PRINTING PROCESS FOR HYDROPHILIC FIBROUS MATERIAL

Raymond Défago, Riehen; Visvanathan Ramanathan, Basel, both of Switzerland, and Gerhard Back, Lorrach, Germany, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Oct. 15, 1974, Ser. No. 515,104

Claims priority, application Switzerland, Nov. 2, 1973, 15456

Int. Cl.² D06P *1/10, 1/12*

U.S. Cl. 8—2.5 A **16 Claims**

1. In a transfer printing process for the dyeing or printing of hydrophilic fibrous material which comprises (A) bringing the surface of a hydrophilic fibrous material into contact with the treated surface of a carrier, said carrier sheet having been treated with a printing ink containing at least one transferable, metallizable dye or color former, (B) subjecting the carrier and hydrophilic fibrous material to heat treatment for a time and at a temperature sufficient to achieve transfer of the dye or color former to the hydrophilic fibrous material, (C) separating the hydrophilic fibrous material from the carrier sheet, and (D) subjecting the hydrophilic fibrous material to after-treatment,

the improvement according to which the hydrophilic fibrous material is, prior to contact with the carrier sheet, impregnated with an aqueous solution comprising

a. an organic solvent which

1. has a boiling point higher than 120° C
2. has a solubility in water of at least 25 g/l at 25° C directly or with the aid of an auxiliary solvent, and
3. is sparingly volatile but fluid under the heat treatment conditions of (B), and

b. at least one compound which yields a metal which forms a complex with the dye or color former of the printing ink, and

following impregnation, said hydrophilic fibrous material is dried at a temperature up to about 100° C.

4,033,717

METHOD OF PRODUCING MULTICOLORED YARN, AND YARN AND CARPET MADE THEREBY

Ralph Whitaker, Bala Cynwyd, Pa., assignor to Fred Whitaker Company, Bala-Cynwyd, Pa.

Filed Oct. 6, 1975, Ser. No. 619,631

Int. Cl.² D06P *5/00, 7/00*

U.S. Cl. 8—14 **29 Claims**

1. In a method of making a fabric from a drawn but undyed synthetic yarn, the steps which comprise:

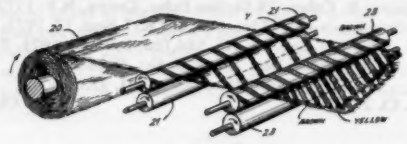
a. forming a prefabric (a) of said drawn but undyed yarn,

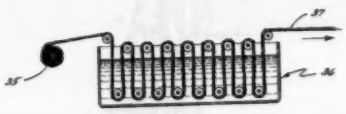
b. dyeing selected portions of said prefabric (a) while leaving other selected portions of said prefabric (a) free of any dye,

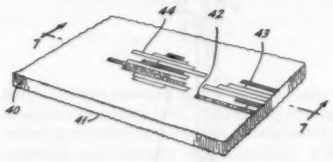
c. raveling the resulting partially dyed prefabric (a) to produce a partially dyed yarn (c),

d. forming said partially dyed yarn (c) into a partially dyed prefabric (d), and

e. substantially completely over-dyeing the entire surface of said partially dyed prefabric (d) so that at least two different colors are intermittently and randomly arranged along the yarn length.







4,033,718

PHOTOACTIVATED BLEACHING PROCESS

Thomas Charles Holcombe, and Robert Howard Schultz, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 419,320, Nov. 27, 1973, abandoned. This application Sept. 8, 1975, Ser. No. 611,588

Int. Cl.² D06L *3/02, 3/04*

U.S. Cl. 8—103 **8 Claims**

1. A process for removing stains from textiles which comprises treating the textiles, in the presence of visible light and oxygen, with an aqueous solution containing:

a. a concentration of from 78 milligrams per liter to 1,440 milligrams per liter of an anionic surfactant;

b. a concentration of from 215 milligrams per liter to 2,140 milligrams per liter of an alkaline builder salt; and

c. a concentration of from 0.25 milligrams per liter to 125 milligrams per liter of a bleach photoactivator which is a mixture of sulfonated zinc phthalocyanine species in which the relative densitometer values (RDV's) of the various sulfonated zinc phthalocyanine species in the mixture are:

Specie	RDV
unsulfonated	0
monosulfonated	0
disulfonated	0–15
trisulfonated plus tetrasulfonated	(100)-(RDV for disulfonated).

4,033,719

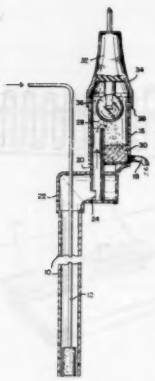
ULTRAVIOLET STERILIZER

Arnold Conn, 253 West End Ave., Brooklyn, N.Y. 11207, and Harvey K. Cohen, 79 Skyline Drive, Coram, N.Y. 11727

Continuation-in-part of Ser. Nos. 397,637, Sept. 17, 1973, Pat. No. 3,965,007, and Ser. No. 586,186, June 12, 1975. This application Dec. 22, 1975, Ser. No. 643,149

Int. Cl.² A01K *64/02*; A61L *3/00*

U.S. Cl. 21—102 R 6 Claims



1. An aquarium comprising a recirculating water flow filter system including an air stone for mixing air with the recirculating water, a diffuser connected in said recirculating water flow system, said diffuser comprising a container, baffle and conduit means for carrying the air-water mixture from said recirculating water flow system to said container and thereby thinning the flow sheet of said air-water mixture passing from said conduit means to said container, an ultraviolet sterilizer comprising a source of ultraviolet light, a housing for holding said source of ultraviolet light and means for attaching said housing to said diffuser and locating said source of ultraviolet light proximate to said sheet of air-water mixture flowing out of said conduit means for irradiating said thinned out air-water mixture.

4,033,720

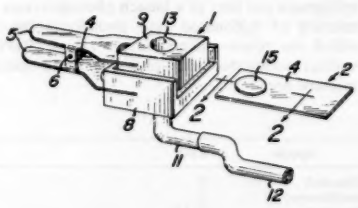
UNITARY SAMPLING AND ANALYSIS STRIP AND PROCESS

Achille Silvestri, Bel Air, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 31, 1974, Ser. No. 475,079

Int. Cl.² G01N *31/22*

U.S. Cl. 23—230 R 1 Claim



1. A method of detecting contaminants in fluids comprising the steps of: providing a unitary contaminant sampling and chromatographic analysis strip having a filter portion which is fluid porous with pores smaller than contaminants and a chromatographic portion disposed longitudinally therefrom: collecting a contaminant sample upon the said filter portion by traversely passing a contaminant containing fluid through the pores of the filter portion without engaging the said chromatographic portion and thereby leaving a contaminant sample upon said filter portion; chromatographing said sample with the application of a solvent to the sample and said strip; and then analyzing the resultant chromatographic portion.

4,033,721

ANALYSIS OF GENTIAN VIOLET RESIDUE IN TISSUE

Gregg W. Taylor, Murrayville, Ga., assignor to A.H.P., Inc., Gainesville, Ga.

Continuation-in-part of Ser. No. 342,290, March 16, 1973, Pat. No. 3,916,027, Continuation-in-part of Ser. No. 454,000, March 22, 1974, Pat. No. 3,915,637, Continuation-in-part of Ser. No. 595,876, July 14, 1975, Continuation-in-part of Ser. No. 625,873, Oct. 24, 1975, Continuation-in-part of Ser. No. 658,760, Feb. 17, 1976, Pat. No. 3,975,158. This application Aug. 16, 1976, Ser. No. 714,895

Int. Cl.² G01N *33/16*

U.S. Cl. 23—230 B 24 Claims

1. A process for the analysis of gentain violet in a material which comprises:

a. finely particulating a known amount of material containing gentian violet, unless such material is already in a finely divided state;

b. admixing a known amount of acidified ethanol with said finely particulated material and letting the resultant admixture stand, said acidified ethanol removing said gentian violet from said material;

c. separating said acidified ethanol (b) from said admixture (b) by centrifugation;

d. removing any spectrophotometrical interfering substance from said acidified ethanol (c) by passing said acidified ethanol (c) through a chromatograph column, containing a basic sorbent, the acid in said acidified ethanol (c) being neutralized;

e. concentrating said neutralized ethanol (d) so that the concentration of said gentian violet therein is increased;

f. determining the amount of getian violet in said neutralized ethanol (e) and the background measurement of said neutralized ethanol (e) by spectrophotometrical means;

g. quenching said gentian violet in said neutralized ethanol (e) by adding to said neutralized ethanol (e) a chemical substance which selectively renders said gentian violet non-detectable by spectrophotometric means without disturbing the spectrophotometric background of said neutralized ethanol;

h. determining the background measurement of said neutralized ethanol (e) by spectrophotometrical means; and

i. calculating the quantitative amount of gentian violet in said material using the spectrophotometrical measurements of steps (f) and (h).

4,033,722

ASSAY FOR MYASTHENIA GRAVIS

Jon M. Lindstrom, Del Mar, Calif., assignor to The Salk Institute for Biological Studies, San Diego, Calif.

Filed Aug. 8, 1975, Ser. No. 603,243

Int. Cl.² G01N *33/16*; A61K *43/00*

U.S. Cl. 23—230.3 8 Claims

5. A diagnostic test for determination of myasthenia gravis comprising the steps of preparing a complex of acetylcholine receptor protein derived from human muscle, toxin and a radioactive isotope, incubating said complex with a serum sample from a patient so as to join antibodies engendered by myasthenia gravis to receptor in said complex, precipitating

said antibody-complex with anti-immunoglobulin and measuring the radioactivity of said precipitate.

4,033,723

PREGNANCY TEST DEVICE

Morris Lincoln Givner, Pierefonds, and Guenther Schilling, Westmount, both of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,860
Claims priority, application Canada, Dec. 17, 1975, 242214
Int. Cl.² B01D *31/00;* **G01N** *21/04, 33/16*
U.S. Cl. 23—253 R **10 Claims**

1. A pregnancy test device suitable for the detection of human chorionic gonadotropin or its β-subunit thereof in urine or serum, which comprises:

a. chamber means including a ultrafiltration membrane for concentration of the urine or serum and means for collecting the concentrate;

b. means for transferring the collected concentrate to a detection receptacle means;

c. detection receptacle means for the detection of human chorionic gonadotropin or its β-subunit thereof in the concentrate by immunological means; and

d. wherein said chamber means including an ultrafiltration membrane has been prewashed with a solution of protein.

4,033,724

OXYGENATOR HAVING A VARIABLE CAPACITY OXYGENATING TUBE

Tatsuo Tamiya, Chiba, Japan, assignor to Senko Medical Instrument Mfg. Co. Ltd., Tokyo, Japan

Filed June 10, 1975, Ser. No. 585,633
Claims priority, application Japan, May 15, 1975, 50-64506[U]; June 2, 1975, 50-74528[U]
Int. Cl.² A61M *1/03*
U.S. Cl. 23—258.5 BH **4 Claims**

1. An oxygenator comprising:

a blood storage tube of a cylindrical shape;

an oxygenating tube longitudinally inserted in said blood storage tube in coaxial relation thereto;

at least one blood inlet port provided at a lower end of said oxygenating tube;

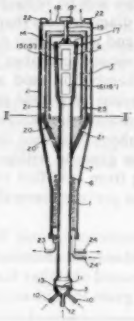
an oxygen disperser, provided within a central portion of the lower end of said oxygenating tube, including an injection plane composed of a perforated plate of a concave section, having a downwardly recessed surface;

a debubbling chamber provided within the annulus formed by said blood storage tube and said oxygenating tube and disposed at the upper portions thereof

a blood storage chamber defined by a substantially lower portion of said blood storage tube;

a heat exchanger wound around said oxygenating tube in said blood storage tube;

a blood capacity control means including an uppermost blood outlet at the top of said oxygenating tube and at least one outer side opening provided in a side wall of the substantially upper portion of said oxygenating tube and at least one corresponding inner side opening provided in a side wall of an internal cylindrical member rotatably



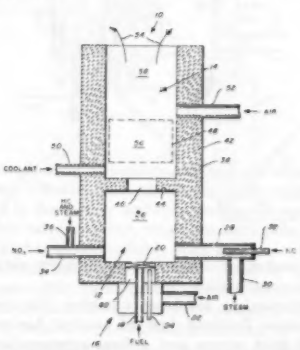
longitudinally inserted in said substantially upper portion of said oxygenating tube, wherein, by rotating the internal cylindrical member, each pair of said outer and inner side openings are brought into alignment with each other thereby creating a lower blood outlet or deviated from their aligned positions thereby providing for the flow of blood through said uppermost outlet whereby the blood capacity of said oxygenating tube is controlled.

4,033,725

APPARATUS FOR NO_x CONTROL USING STEAM-HYDROCARBON INJECTION

Robert D. Reed, and Eugene C. McGill, both of Tulsa, Okla., assignors to John Zink Company, Tulsa, Okla.

Division of Ser. No. 228,823, Feb. 24, 1972, Pat. No. 3,911,083. This application July 30, 1975, Ser. No. 600,386
Int. Cl.² B01D *53/34;* **F23G** *7/06*
U.S. Cl. 23—277 C **2 Claims**



1. A furnace system for the reduction of nitrogen oxides, comprising:

a. a refractory lined furnace having a first and second chamber of substantially the same diameter; the first end of said first chamber being a plane surface;

b. first axial means for introducing gaseous fuel and stoichiometric air for burning said fuel into said first chamber

at said first end, and including ignition means for igniting said fuel;

c. second means to radially inject combustible hydrocarbon and steam at a plane close to said first end of said first chamber to create a reducing atmosphere in said first chamber;

d. third means for radially introducing nitrogen oxide containing gases into the reducing atmosphere in said first chamber at the first end of said first chamber whereby said nitrogen oxides will be reduced;

e. passage means of diameter less than said chamber diameter at the second end of said first chamber leading to the first end of said second chamber for the flow of gases from said first chamber to said second chamber, said passage means having transverse parallel walls;

f. fourth means for radially introducing cooling means into said second chamber at its said first end to reduce the temperature of the gases to within the range of 1250° to 2000° F. entering from said first chamber to a temperature low enough to prevent thermal regeneration of nitrogen oxides; and

g. fifth means downstream of said fourth means near the second end of said second chamber for radially introducing air into said second chamber for burning combustibles remaining in the gases in said second chamber.

4,033,726

SPENT CATALYST REGENERATION APPARATUS WITH INTERNAL AND EXTERNAL REGENERATED-CATALYST RECYCLE MEANS

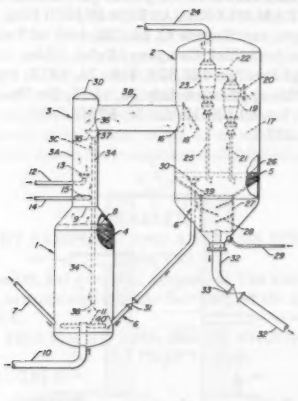
Richard P. Pulak, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 429,422, Dec. 28, 1973, Pat. No. 3,953,175. This application Dec. 16, 1974, Ser. No. 533,052

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.[2] B01J *8/08, 8/18, 37/14*

U.S. Cl. 23—288 B **8 Claims**



1. An apparatus for oxidizing coke on spent catalyst which comprises in combination:

a. a spent-catalyst receiving chamber for containing a dense-phase fluidized bed of catalyst having a spent-catalyst inlet means and a fresh-regeneration-gas inlet means connected thereto to allow passage of spent catalyst and fresh regeneration gas respectively into said chamber and having a regenerated-catalyst/regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and regeneration gas from said chamber;

b. a transfer conduit having a substantially vertical portion and a substantially horizontal portion, said vertical portion having an inlet connected to the regenerated-catalyst/regeneration-gas outlet means and said horizontal portion extending into the side of a hereinafter described regenerated-catalyst receiving chamber and having an outlet within said chamber whereby regenerated catalyst and regeneration gas are carried from said spent-catalyst receiving chamber in admixture to said regenerated-catalyst receiving chamber, said transfer conduit having a combustible fluid inlet means to allow passage of combustible fluid to said transfer conduit and a fresh regeneration gas inlet means to allow passage of fresh regeneration gas into said conduit;

c. an internal regenerated-catalyst recycle means, having an inlet means in the transfer conduit and an outlet means in the spent-catalyst receiving chamber, to allow passage of a portion of regenerated catalyst from the transfer conduit to the spent-catalyst receiving chamber;

d. a regenerated-catalyst receiving chamber for containing a dense-phase bed of regenerated catalyst, said chamber having a regenerated-catalyst outlet means and a spent-regeneration-gas outlet means connected thereto to allow passage of regenerated catalyst and spent regeneration gas from said chamber and said chamber being positioned adjacent to and at an elevation with respect to said spent-catalyst receiving chamber to maintain at least a portion of said dense-phase bed of regenerated catalyst above said dense-phase fluidized bed of catalyst in said spent-catalyst receiving chamber; and,

e. an external regenerated-catalyst recycle means, having an inlet means in the regenerated-catalyst receiving chamber and an outlet means in the spent-catalyst receiving chamber, to allow passage of a portion of regenerated catalyst from the regenerated-catalyst receiving chamber to the spent-catalyst receiving chamber.

4,033,727

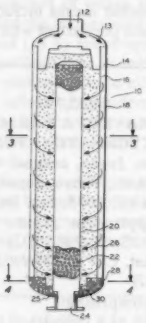
SEPARATOR RING IN FIXED BED RADIAL FLOW CATALYTIC REACTOR

Lucien H. Vautrain, Sweeny, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed July 6, 1976, Ser. No. 703,027

Int. Cl.[2] B01J *8/02;* **C10G** *35/04*

U.S. Cl. 23—288 R **6 Claims**



1. In a vertically disposed reactor comprising:

side walls, a top wall and a bottom wall;

an inlet opening at an upper end thereof;

an annulus communicating with said inlet opening, said annulus being formed by said side walls and a preforated means spaced inwardly from said side walls;

a centrally disposed apertured withdrawal conduit having an outlet opening at a lower end thereof;

the improvement comprising an annular separator ring extending upwardly from said bottom wall of said reactor between said side wall and said central apertured withdrawal conduit to a level within the range of 0 to 3 inches

below a lowermost row of apertures in said central apertured withdrawal conduit, an annular space defined by said separator ring and said side wall being filled with catalyst support to a level essentially coextensive with a top of said separator ring and an annular space defined by said separator ring and said central apertured withdrawal conduit being partially filled with catalyst support, catalyst being present between said centrally disposed withdrawal conduit and said perforated means.

4,033,728
SYNTHETIC CAKING COAL AND METHOD FOR PRODUCTION THEREOF

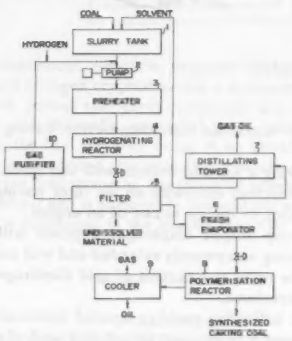
Yutaka Aoki, Tokyo; Akira Hase, Kawasaki, and Jiro Ito, Kamakura, all of Japan, assignors to Nissho-Iwai Co., Ltd., Japan

Filed Nov. 6, 1975, Ser. No. 629,536

Claims priority, application Japan, Nov. 11, 1974, 49-129799

Int. Cl.² C10L *9/10*; C10G *1/06*

U.S. Cl. 44—1 R **8 Claims**



5. Process for producing synthetic caking coal which comprises the following steps (1) adding finely pulverized weakly or non-caking coal to a solvent to form a slurry, hydrogenating the slurry in the presence or absence of hydrogenating catalyst under a high pressure hydrogen gas atmosphere, separating coal hydrogenated product, and then (2) heat-polymerizing the hydrogenated product in the presence or absence of a polymerizing catalyst at an elevated temperature preferably under an inert atmosphere, discharging and cooling the reaction product.

6. Process for producing synthetic caking coal according to claim **5** wherein the hydrogenation is carried out at a temperature of about 300° C to 500° C under a hydrogen pressure of about 70 to about 150 atm.

4,033,729
METHOD OF SEPARATING INORGANIC MATERIAL FROM COAL

Charles E. Capes; René J. Germain; Allan E. McIlhinney; Ira E. Puddington, and Aurelio F. Sirianni, all of Ottawa, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Apr. 26, 1976, Ser. No. 680,592

Claims priority, application Canada, June 20, 1975, 229763

Int. Cl.² C10L *9/00*, *10/00*, *9/10*

U.S. Cl. 44—1 A **4 Claims**

1. A method of separating inorganic materials from coal, comprising:

a. providing the coal, containing the inorganic materials, in particulate form as a suspension with a liquid hydrocarbon oil.

b. mixing an aqueous agglomerating liquid comprising water, which is immiscible with the liquid hydrocarbon oil, with the suspension,

c. mixing a particulate material having a hydrophilic surface that is readily wetted by liquid water with the suspension,

d. agitating the suspension, with the aqueous agglomerating liquid and particulate material having a hydrophilic surface mixed therewith, to agglomerate inorganic particulate materials in the suspension with the aid of the said particulate material having a hydrophilic surface, while leaving at least a major portion of the particulate coal dispersed in the liquid hydrocarbon oil, and then

e. separating the agglomerated inorganic material from at least a major portion of the liquid hydrocarbon oil and pulverized coal.

3. A method according to claim **1**, wherein the particulate material having a hydrophilic surface is a material selected from the group consisting of ash, agglomerated silica flour, coarse silica chips, limestone and peat moss.

4,033,730
PROCESS AND APPARATUS FOR FEEDING PARTICULATE SOLIDS INTO A PRESSURE REACTOR

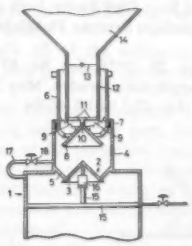
Gerhard Baron, Hofheim; Carl Hafke, Frankfurt am Main; Dietrich Engler, Hofheim; Rainer Reimert, Oberhochstadt, and Eberhard Blaum, Frankfurt am Main, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed June 4, 1976, Ser. No. 693,043

Claims priority, application Germany, Feb. 5, 1976, 2604383

Int. Cl.² C10J *3/30*

U.S. Cl. 48—86 R **10 Claims**



1. Feeder for feeding particulate coal into a coal gasification reactor having a reactor inlet, the feeder comprising: a guide cylinder fixed to the reactor and surrounding the reactor inlet, a first movable valve member, means mounting the first movable valve member to controllably open and close the reactor inlet, a cylindrical container having an outlet in the bottom thereof and gas-tightly mounted for longitudinal movement in the guide cylinder, a stationary feed conduit directed towards the container, means for controllably moving the container between a first position wherein the outlet is adjacent said reactor inlet and a second position wherein the outlet is spaced apart from the reactor inlet, a second movable valve member for opening and closing the container outlet and a first means coactive with said second valve member and responsive to the movement of the container from the first position towards the second position for effecting opening of the outlet and a second means responsive to the movement of the container from the second position towards the first position for effecting closing of the outlet.

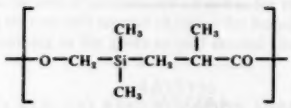
4,033,731

PARTIALLY CROSSLINKED SILALACTONE POLYMERS, THEIR PREPARATION AND THEIR USE

Michel Bargain, and Zeno Pasquini, both of Lyon, France, assignors to Rhone Poulenc S.A., Paris, France

Division of Ser. No. 478,604, June 12, 1974, Pat. No. 3,948,864. This application July 29, 1975, Ser. No. 600,045
Claims priority, application France, June 13, 1973, 73.21494
Int. Cl.² B01D 59/14
U.S. Cl. 55—16 3 Claims

1. A method of separating at least one gas component from a gaseous mixture of at least two of oxygen, nitrogen and carbon dioxide which comprises bringing the gaseous mixture into contact with one side of a membrane having selective permeability to gases comprising a 3,5,5,-trimethyl-1-oxa-5-sila-cyclohexan-2-one polymer having repeat units of Formula I:



I

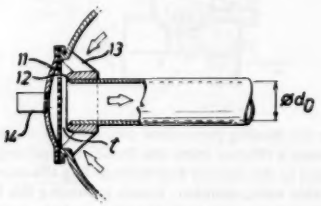
at least some of the units being cross-linked to one another and recovering from the other side of the membrane a gaseous mixture enriched in at least one gas component.

4,033,732

METHOD AND APPARATUS FOR CLEANING FABRIC FILTERS OF BAG TYPE OR THE LIKE

Birger Axelsson, and Sven-Olof Rosby, both of Vaxjo, Sweden, assignors to Aktiebolaget Svenska Flaktfabriken, Stockholm, Sweden

Filed Apr. 29, 1975, Ser. No. 572,925
Claims priority, application Sweden, May 2, 1974, 7405903
Int. Cl.² B01D 46/04
U.S. Cl. 55—96 11 Claims



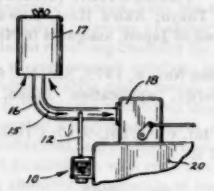
1. A method of cleaning fabric filters of bag type comprising exposing the surface of the filter material opposite the surface having dust particles collected thereon to a high gaseous pressure pulse passed to said surface opposite the dust-collecting surface from a pressure tank so as to cause flow of gas through the filter to remove particles from the dust-collecting surface, establishing said pressure pulse at a rate between 0.4 MPa/s and 1.2 MPa/s while keeping the numerical relation between said pressure increasing rate and the initial air pressure above the atmospheric in said pressure tank between 3 and 5, said initial air pressure being kept between 0.11 MPa and 0.25 MPa, said pressure pulse reaching its maximum within a time interval less than 30 milliseconds.

4,033,733

AIR FILTER GAUGE

Richard D. Nelson, Decorah, Iowa, assignor to Joseph N. Nelson, Waterloo, Iowa

Filed Feb. 23, 1976, Ser. No. 660,658
The portion of the term of this patent subsequent to Feb. 17, 1993, has been disclaimed.
Int. Cl.² B01D 46/00
U.S. Cl. 55—274 3 Claims



1. An air filter restriction indicating device, having in combination

a housing having a top and bottom wall and having in upstream connection therewith an air filter having an air stream passing to the air intake of an engine,

an inverted cup shaped diaphragm disposed within said housing having an upwardly extended end wall and means securing the open end portion of said diaphragm to the housing thereabout,

a cup shaped indicating member tapered downwardly having its bottom wall secured to said end wall of said diaphragm, the bottom wall of said indicating member having a substantially lesser width than that of the underlying wall portion of said diaphragm,

a passage through said housing at one end thereof connected downstream of the air filter providing communication with said indicating member and said air stream,

a passage through said housing at the other end thereof providing communication between said diaphragm and the atmosphere,

spring means disposed within said housing bearing against said indicating member and said housing holding the same in nested position within said diaphragm with said diaphragm in infolded position and with said air filter in a clean operating position, said spring means having a compressive force such as to represent the differential between the atmospheric pressure upon said diaphragm at one side of said housing and the partial vacuum drawn by said air stream upon said indicating member at said other side of said housing,

said housing having a transparent wall portion and an annular non-transparent portion at one end of said transparent wall portion,

said indicating member having a rim portion visible through said transparent wall portion and having linear movement to show the progressive condition of restriction of said air filter,

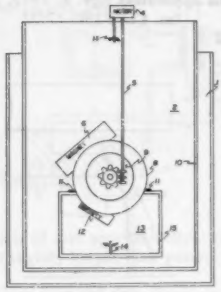
said non-transparent annular wall portion being positioned to have said rim portion in register therewith and to shield the same to indicate a full restriction of said air filter, and

said spring means moving said indicating member in a restriction indicating position only with an air stream passing to the air intake of an engine.

4,033,734
CONTINUOUS, NONCYCLIC MAGNETIC REFRIGERATOR AND METHOD

William A. Steyert, Jr., 1442 - 47th St., and Stephen S. Rosenblum, 641-A - 43rd St., both of Los Alamos, N. Mex. 87544

Filed Sept. 17, 1976, Ser. No. 724,404
Int. Cl.² F25B *21/02*
U.S. Cl. 62—3 8 Claims

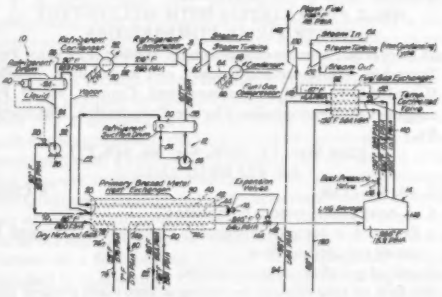


1. A continuous, noncyclic magnetic refrigerator consisting of a liquid nitrogen cryostat having a motor-driven wheel with a pressed, porous rare earth compound as a rim that rotates through two thermally separated inner reservoirs of liquid cryogen, the first reservoir being at an elevated temperature relative to the second reservoir, two superconducting magnets of different field strengths, the larger of which is situate in the first reservoir and is adjacent to the said rim while the smaller magnet is positioned in the second reservoir adjacent to the said rim.

4,033,735
SINGLE MIXED REFRIGERANT, CLOSED LOOP PROCESS FOR LIQUEFYING NATURAL GAS

Leonard K. Swenson, Kansas City, Mo., assignor to J. F. Pritchard and Company, Kansas City, Mo.

Continuation of Ser. No. 612,183, Sept. 10, 1975, abandoned, which is a continuation of Ser. No. 106,524, Jan. 14, 1971, abandoned. This application Nov. 8, 1976, Ser. No. 739,793
Int. Cl.² F25J *1/00*
U.S. Cl. 62—9 11 Claims



1. A process for cooling a fluid feed material from an initial temperature to a level from over 200° Farenheit to over 300° Farenheit therebelow and consisting essentially of the steps of:

providing a single mixed refrigerant composition capable of said material and containing a number of refrigerant constituents having a wide range of successively lower boiling points;

passing said refrigerant composition through a single closed loop refrigeration cycle consisting essentially of compression, partial condensation, multiple path heat exchange and expansio.. zones;

maintaining the flowing constituents of the refrigerant composition and the relative proportions thereof indentical throughout said compression, partial condensation, multiple path heat exchange and expansion zones of the single closed loop cycle,

the total mixed refrigerant composition being successively directed

1. from the compression zone to the partial condensation zone for partial condensation of the refrigerant by an external cooling medium to produce a vapor phase and a liquid phase,
2. the vapor phase and the liquid phase from the condensation zone are combined,
3. the combined phases are directed to the heat exchange zone for flow without change in composition along
   a. a first path therethrough, next
   b. to the expansion zone, and then
   c. back to the heat exchange zone for flow along a second path therethrough in countercurrent, thermal interchange relationship to refrigerant flow along said first path, and
4. the refrigerant composition is then returned to the compression zone;

directing the fluid feed material through said heat exchange zone along a third path in concurrent flow thermal interchange relationship to the refrigerant flowing along said first path and countercurrent to the refrigerant flow along said second path to effect the required cooling of the fluid feed material in said heat exchange zone by only the refrigerant composition of said single closed loop cycle,

at least one of the refrigerant constituents having a boiling point in the second path lower than the temperature level to which the fluid feed material is lowered in said heat exchange zone,

the constituents of the refrigerant composition in admixture having freezing points below said temperature level to which the feed material is lowered, and

said refrigerant composition being characterized by the properties of

1. at least a portion thereof being vaporizable across said expansion zone,
2. substantially all of the refrigerant becoming liquid along said first path through the heat exchange zone, and
3. substantially all of the composition undergoing vaporization along said second path through the heat exchange zone at the respective temperatures and pressures of the refrigerant existing along said first and second paths; providing a total of at least five refrigerant constituents in said refrigerant composition in

1. relative quantities of
2. respective relative boiling points and
3. circulating the refrigerant composition in said closed loop cycle at a sufficiently higher rate than the flow of feed material along said third path through the heat exchange zone, to
   a. lower the temperature level of said fluid feed material in the heat exchange zone as it flows therethrough from more than 200° Fahrenheit to over 300° Fahrenheit below its initial temperature as directed to the heat exchange zone, while
   b. maintaining a minimal temperature difference between the fluid feed material and the refrigerant composition in thermal interchangeable relationship thereto throughout the length of the heat exchange zone, and at the same time to
   c. cause the combined cooling curve of the fluid feed material flowing along said third path and the refrigerant flowing along said first path and the heating curve of the refrigerant flowing along said second path to both be of relatively straight, closely adjacent, generally matched configuration throughout the respective

flow paths of the refrigerant and said feed material through the heat exchange zone; and

passing a cooling medium in heat exchange relationship with the refrigerant composition flowing through said partial condensation zone,

said cooling medium being at a temperature from more than 200° Fahrenheit to over 300° Fahrenheit above the temperature of the fluid feed material exiting from said heat exchange zone,

at least one other of the refrigerant constituents having a boiling point to cause only partial condensation of the refrigerant in said partial condensation zone at the temperature and pressure of the refrigerant composition as it flows through said partial condensation zone from the compression zone to the heat exchange zone.

4,033,736

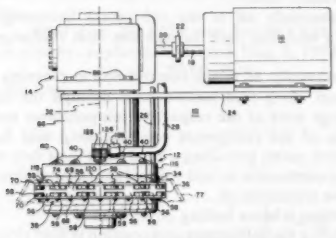
CONTINUOUS METHOD FOR MAKING ROD-LIKE SOLID CARBON DIOXIDE EXTRUSIONS

Lyle L. Cann, Peotone, Ill., assignor to Chemetron Corporation, Chicago, Ill.

Continuation of Ser. No. 515,650, Oct. 17, 1974, abandoned, which is a continuation of Ser. No. 389,255, Aug. 17, 1973, abandoned, which is a continuation of Ser. No. 284,264, Aug. 28, 1972, Pat. No. 3,786,645. This application Apr. 5, 1976, Ser. No. 673,772

Int. Cl.² F25J *1/00*

U.S. Cl. 62—10 **4 Claims**



1. A method of continuously forming rodlike extrusions of solid phase carbon dioxide from liquid carbon dioxide, comprising the steps of:

a. Flashing liquid carbon dioxide in an expansion zone to form solid and gaseous carbon dioxide, said solid carbon dioxide being collected in an extrusion chamber which communicates with an outlet of said expansion zone and an inlet of an extrusion passage,

b. Filtering said gaseous carbon dioxide from within said extrusion chamber and said extrusion passage through filter means communicating with said extrusion chamber,

c. Forcing said solid carbon dioxide into said extrusion passage by a rotary forcing means, against a constant back pressure produced by a spring means which spans the outlet of said extrusion passage, and

d. Extruding a rod-like extrusion of solid carbon dioxide past said spring means in response to force produced by said forcing means.

4,033,737

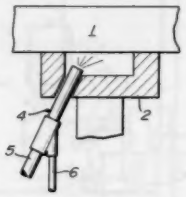
METHOD OF COOLING A STEEL MATERIAL WITHOUT DEFORMATION

Kazuo Kunioka, Yokohama; Kiwami Kurihara, Musashino; Koji Sakasegawa, Hiroshima; Atushi Ohsumi, Hiroshima; Akio Watanabe, Hiroshima, and Kenichi Sakai, Okayama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 341,063, March 14, 1973, abandoned. This application Apr. 1, 1975, Ser. No. 564,191

Int. Cl.² F25D *17/02*

U.S. Cl. 62—64 **6 Claims**



1. A method of cooling a steel body which comprises the steps of:

i. providing a skid having a base and peripheral upstanding walls defining a central cavity,

ii. placing said steel body on the upper edges of the peripheral upstanding wall and positioned above the central cavity,

iii. directing a liquid coolant, admixed with gas to form a two-phase jet flow, into the central cavity to cool the undersurface of the steel body overlying the central cavity and,

iv. directing the liquid coolant onto a remaining area of the steel body,

whereby the difference in temperature between the skid-contacting area of the steel body and the remaining area is minimized thereby to cool the steel without deformation.

4,033,738

HEAT PUMP SYSTEM WITH MULTI-STAGE CENTRIFUGAL COMPRESSORS

Carl R. Merola, Monroeville Borough; William F. Evans, Penn Township, Westmoreland County, and Raymond E. Shaffer, Hempfield Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 12, 1976, Ser. No. 666,277

Int. Cl.² G05D *23/32*

U.S. Cl. 62—158 **8 Claims**

1. A heat pump system comprising:

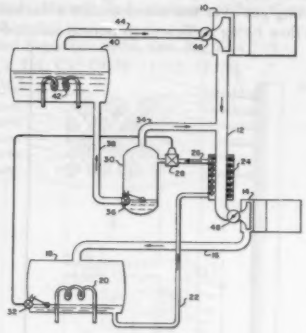
a first and a second refrigerant compressor arranged for series refrigerant flow;

a pair of parallel control circuits;

the first of said circuits including a first main control relay required to be energized to start said first compressor, and the second of said circuits including a second main control relay required to be energized to start said second compressor;

means electrically interconnecting said circuits to make the energization of said second control relay dependent upon the energization first of said first control relay and the elapse of a short time period following the energization of said first control relay, and to make the continued energization of said first control relay beyond a time period

slightly longer than said short time period following initial energization of said first control relay dependent upon



the energization of said second control relay before the elapse of said slightly longer time period.

4,033,739

REFRIGERATION UNIT

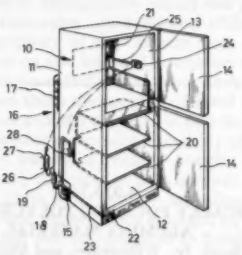
Jürgen Ballarin, Giengen, Germany, assignor to Bosch-Siemens Hausgerate GmbH, Stuttgart, Germany

Filed Feb. 6, 1976, Ser. No. 655,695

Claims priority, application Germany, Feb. 22, 1975, 2507706

Int. Cl.² G05D *23/30*

U.S. Cl. 62—202 **5 Claims**



1. A refrigeration unit, particularly a dual temperature refrigerator, with a refrigeration machine driven by a single compressor energized by an electric current flowing through an electric circuit, having a refrigeration cycle with coolant flowing in a coolant circuit through a condenser, a refrigerant metering capillary device and refrigerant transfer lines with at least two evaporator sections disposed in series in the flow path of the refrigerant, the first of said two evaporator sections associated with a colder compartment and the second of said two evaporator sections associated with a warmer compartment, two separate, intermittently activated, control elements, one of said control elements associated with the warmer compartment depending on the temperature therein, switches the current of a first heating element of a refrigerant collector attached to said coolant circuit before said metering capillary and from which latter liquid refrigerant is discharged when said heating element is switched on, thereby filling said second evaporator section, said second control element associated with said colder compartment being disposed in said electric circuit of said compressor, a sensor in said colder compartment for activating said second control element, a second heating element adjacent said sensor for heating said sensor, said second heating element being connected in series with said first control element whereby said first control element indirectly activates said compressor by means of said second heating element which heats said sensor which in turn triggers switching of said second control element and activation of said compressor.

4,033,740

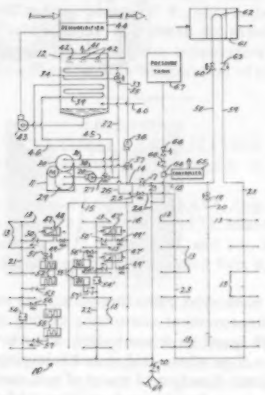
COMBINED ENVIRONMENTAL CONTROL AND FIRE PROTECTION SYSTEM

Gershon Meckler, Bethesda, Md., assignor to Gershon Meckler Associates, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,623

Int. Cl.² F25D *23/12, 15/00, 23/12*; A62C *37/06*

U.S. Cl. 62—259 **5 Claims**

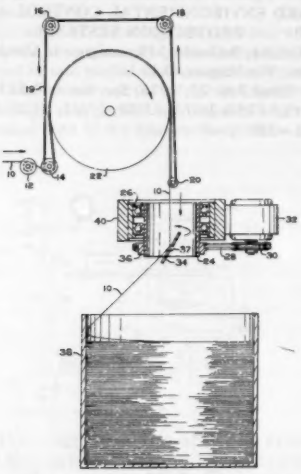


1. An improved circulating system for a building comprising a plurality of energy absorbing units located within the building, cooling means for cooling a heat transfer fluid, supply line means for circulating cooled heat transfer fluid from said cooling means to said energy absorbing units, return line means for circulating such heat transfer fluid from the energy absorbing units to said cooling means, open valve means located between said return line means and said cooling means, a plurality of check valves, means mounting said check valves between said energy absorbing units and said return line means, said check valves being oriented to prevent a fluid flow from said return line means to said energy absorbing units while being ineffective to prevent a fluid flow in a reverse direction, a plurality of sprinkler heads each including means responsive to a predetermined high temperature for activating such sprinkler heads, means connecting said sprinkler heads to said return line means, means for sensing a flow of heat transfer fluid from any of said sprinkler heads, means responsive to said sensing means sensing a fluid flow from any sprinkler head for closing said open valve means, means responsive to said sensing means sensing a fluid flow from any sprinkler head for supplying water under pressure to said return line means, and wherein said cooling means includes first and second closed circuit evaporative cooling means for transferring heat from the circulated heat transfer fluid to air circulated through said evaporative cooling means, means for circulating the heat transfer fluid sequentially from said return line means through said open valve means and said first and second evaporative cooling means to said supply line means, means for circulating fresh outside air through said first evaporative cooling means and means for exhausting air from the building through said second evaporative cooling means to the atmosphere, whereby the circulated heat transfer fluid is cooled to a temperature above the dew point of air in the building.

4,033,741
METHOD AND APPARATUS FOR FORMING CONTAINERIZED GLASS STRAND PACKAGE

Warren W. Drummond, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 19, 1976, Ser. No. 650,329
Int. Cl.² C03B 37/02
U.S. Cl. 65—2 13 Claims



1. In the method of collecting glass fiber strands in a container, the improvement comprising pulling said strands at a high rate of speed in a controlled direction, ejecting said strand into a zone where said strand is impinged on a surface angled from the direction of travel of said strand and rotating said surface around said strand, swirling said strand from said surface to form a plurality of coils of said strand without said strand becoming fluffed by said impingement on said surface and collecting said coils of said strand in a container.

4,033,742
METHOD FOR PRODUCING GLASS FIBERS

Claude R. Nichols, Glendora, and Keith A. Helberg, Covina, both of Calif., assignors to Kaiser Glass Fiber Corporation, Oakland, Calif.

Filed Feb. 13, 1976, Ser. No. 658,122
Int. Cl.² C03B 37/02
U.S. Cl. 65—2 6 Claims

1. The method of establishing the running mode of a glass fiber producing orifice plate having orifice plate heating means and closely spaced orifices comprising:

a. permitting molten glass to flood the underside of the orifice plate;

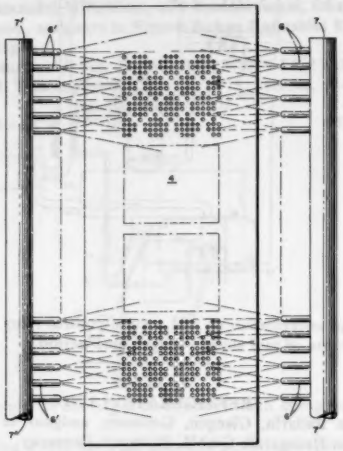
b. establishing the temperature of the orifice plate to provide a glass viscosity at the orifices of more than about 1000 poises;

c. forming a matrix of glass on the underside of the orifice plate;

d. directing cooling gas to the underside of said orifice plate from a plurality of nozzles located along each of at least two sides of the orifice area, said nozzles being at an angle of from about 30° to about 60° to said orifice plate, being in generally opposed relationship, being closely adjacent said orifice area, and being directed generally to the center of the plate, said cooling gas flow having a total cross-section at the orifice plate at least as large as the area occupied by orifices;

e. slowly with drawing said matrix of glass from said orifice plate while increasing the temperature of said orifice plate and regulating the flow of said cooling gas to form fiber-forming cones under at least some of the orifices in said orifice plate; and

f. periodically slowly decreasing and increasing the flow of cooling gas over the entire orifice area, said decreases in gas flow being sufficient to permit isolated flooded areas

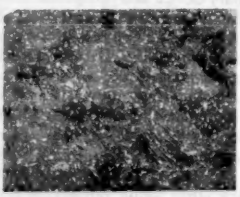


to flow to adjacent fiber forming cones and said increases in gas flow being sufficient to increase the viscosity of the glass to cause flooded areas to fiberize as fibers are drawn from adjacent fiber forming cones to progressively clear additional portions of the orifice area with each variation.

4,033,743
CHEMICALLY POLISHED POLYCRYSTALLINE ALUMINA MATERIAL

Garland E. Scott, Jr., Willoughby, and Michael K. Levenson, Cleveland Hts. both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 453,962, March 22, 1974, Pat. No. 3,935,495. This application June 25, 1975, Ser. No. 590,360
Int. Cl.² C03L 15/00
U.S. Cl. 65—30 R 7 Claims



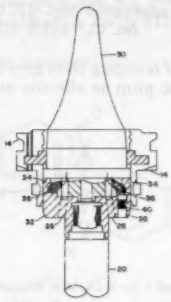
1. A method of increasing the in-line optical transmission of an unpolished light transmissive body of sintered polycrystalline alumina by physically contacting the major surfaces of said alumina body with a molten inorganic flux selected from the group consisting of alkali metal salts and binary oxide systems having an alkali metal oxide constituent that dissolves alumina at elevated temperatures for a time period sufficient to reduce the high spots on the individual exterior alumina crystals without materially etching grain boundaries.

4,033,744

PLUNGER ASSEMBLY FOR A GLASS FORMING MACHINE

Robert Earl Davis, Muncie, Ind., assignor to Ball Corporation, Muncie, Ind.

Filed Sept. 18, 1975, Ser. No. 614,735
Int. Cl.² C03B 11/12, 11/10
U.S. Cl. 65—362 9 Claims



1. A plunger assembly for use in a glass forming machine, said plunger assembly comprising:

an unitary plunger and

an unitary plunger head,

said plunger head having a central bore containing an engaging means within an annular wall, said engaging means comprising a base of a shape to engage a surface of said plunger and spring biased alignment means extending from said base to disengageably secure said plunger head in a mating relationship, and a plurality of flanges spaced about the periphery of said annular wall, said flanges being disposed on said wall and protruding inwardly,

said plunger being a cylindrical member having a reduced annular section about the periphery thereof at a first end of said member and of a diameter to fit within said annular wall and further comprising a plurality of ears radiating outwardly from said reduced annular section and having a spacing sufficient to pass between said flanges and having a width to lie between said alignment means said ears and said flanges being arranged so as to permit said plunger and said plunger head to fixedly engage in said mating relationship.

4,033,745

NON-BURNING STORABLE LIQUID FERTILIZER

William Percy Moore, Hopewell, Va., assignor to Slo Release, Inc., Kingston, Ohio

Filed June 3, 1976, Ser. No. 692,433
Int. Cl.² C05C 9/00
U.S. Cl. 71—28 2 Claims

1. A non-burning, storable, liquid suspension grass turf fertilizer composition with improved stability and turf growth stimulation, comprising: 40 to 45% water; 12 to 16% nitrogen from urea formaldehyde polymers having a urea to formaldehyde mol ratio of 1.6/1 to 2/1 with no free urea of formaldehyde, with 60 to 80% of the nitrogen present in the water insoluble form, and the water insoluble nitrogen having an activity index of 25 to 0.20% by weight insoluble nitrogen having an activity index of 25 to 35; 0.05 to 0.20% by weight methyl alcohol; and 3 to 6% by weight of water soluble sugars in the form of 75 to 96 Brix cane or beet molasses.

4,033,746

FOREST FERTILIZATION

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Filed Dec. 22, 1975, Ser. No. 643,340
Int. Cl.² C05C 9/00, 1/00
U.S. Cl. 71—30 5 Claims

1. The method of fertilizing conifer forests with nitrogen containing compounds by direct aerial application to the conifer foliage of an aqueous solution of said compounds containing at least about 15 weight percent determined as elemental nitrogen of a dissolved water soluble nitrogen source selected from the group consisting of urea, ammonia, nitrates of ammonium, calcium and potassium; ammonium phosphates and sulfates; and combinations thereof, at a dosage level of at least about 100 pounds of elemental nitrogen per acre corresponding to at least about 0.8 pounds of elemental nitrogen per 1000 square meters of specific foliage area, at a temperature of at least about 70° F., above the saturation temperature of said solution, and above the prevailing ambient temperature, and said ambient temperature is at least about 10° F. below the saturation temperature of said solution.

4,033,747

SILVICULTURAL FERTILIZATION

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Continuation-in-part of Ser. Nos. 494,613, Aug. 5, 1974, abandoned, Ser. No. 378,550, July 2, 1973, abandoned, Ser. No. 259,231, June 2, 1972, abandoned, and Ser. No. 57,810, July 23, 1970, abandoned. This application Feb. 4, 1976, Ser. No. 654,997
Int. Cl.² C05C 9/00, 1/00
U.S. Cl. 71—30 9 Claims

1. The method of fertilizing conifer forests wherein said conifers are fertilized with nitrogen-containing compounds by direct application of an aqueous nitrogenous fertilizer to the foliage thereof which comprises spraying the exposed specific surface of said foliage with an aqueous solution containing about 15 to about 32 weight percent determined as elemental nitrogen of a water-soluble nitrogen source selected from the group consisting of urea; ammonia, nitrates of ammonia, calcium and potassium; ammonium phosphates and sulfates; and combinations thereof, and said solution is sprayed on said foliage (1) at a dosage level corresponding to about 15 to about 350 pounds of elemental nitrogen per acre of said conifer forest and (2) corresponding to about 0.8 to about 12 pounds of elemental nitrogen per 1000 square meters of exposed specific foliage area.

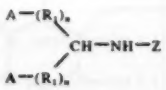
4,033,748

DIBICYCLO[3.1.1] AND [2.2.1] HEPTYL AND DIBICYCLO [3.1.1] AND [2.2.1] HEPTENYL POLYAMINES HAVING A PIPERIDINE MOIETY

Nathaniel Grier, Englewood, N.J.; Richard A. Dybas, Center Square, Pa., and Robert A. Strelitz, Edison, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed July 2, 1976, Ser. No. 702,318
Int. Cl.² C07D 211/26
U.S. Cl. 71—67 19 Claims

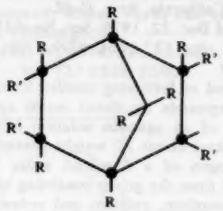
19. A composition for controlling the growth of microbes and algae comprising a compound of the formula:



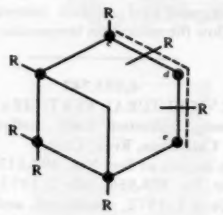
where:

each A is alike or different and is a [2.2.1] bicyclic group of the formula:

a.



or a [3.1.1] bicyclic group of the formula:
b.

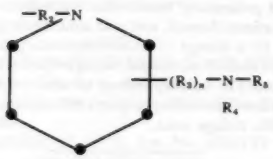


where R is alike or different and is hydrogen or C_1 to C_4 alkyl, R′ is alike or different and is hydrogen or C_1 to C_4 alkyl or R′ on adjacent carbon atoms taken together comprise an olefinic bond, and the dashed line indicates either saturation or c-, d- or d-, e- unsaturation;

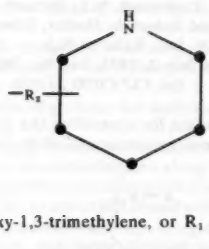
each R_1 is alike or different and is C_1 to C_4 alkylene;

each *n* is alike or different and is the integer 0 to 1;

Z is



or



where

R_2 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

R_3 is 2-hydroxy-1,3-trimethylene, or R_1 as previously defined;

R_4 is hydrogen, aminoethyl, aminopropyl, C_1 to C_4 hydroxyalkyl, or C_2 to C_4 dihydroxyalkyl; and

R_5 is hydrogen, C_1 to C_4 hydroxyalkyl or C_2 to C_4 dihydroxyalkyl, and acid addition salts thereof.

4,033,749

ALKOXYCARBONYLPHOSPHONIC ACID DERIVATIVE BRUSH CONTROL AGENTS

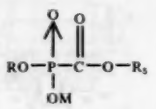
Colin Leslie McIntosh, Newark, Del., assignor to E. I, Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 474,536, May 30, 1974, Pat. No. 3,943,201, which is a continuation-in-part of Ser. No. 397,723, Sept. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 381,620, July 23, 1973, abandoned. This application Sept. 25, 1975, Ser. No. 616,837

Int. Cl.² A01N *9/36*

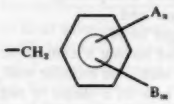
U.S. Cl. 71—86 **9 Claims**

1. A method of retarding plant growth consisting essentially of applying to the plant an effective amount of



wherein

R is M; alkyl of 1 to 8 carbon atoms, optionally substituted with a chlorine, bromine, fluorine, or iodine; alkenyl of 3 to 8 carbon atoms; or



wherein

A is chlorine or methyl,

B is chlorine or methyl,

n is 0 or 1, and

m is 0 or 1;

R_5 is alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 4 carbon atoms, or benzyl;

M is hydrogen, sodium, lithium, potassium, calcium, magnesium, zinc, manganese, barium, or

wherein

R_1 is hydrogen, alkyl of 1 to 4 carbon atoms, or hydroxyalkyl of 2 to 4 carbon atoms;

R_2 is hydrogen, alkyl of 1 to 4 carbon atoms, or hydroxyalkyl of 2 to 4 carbon atoms;

R_3 is hydrogen, alkyl of 1 to 4 carbon atoms, or hydroxyalkyl of 2 to 4 carbon atoms; and

R_4 is hydrogen or alkyl of 1 to 12 carbon atoms, provided that the total number of carbon atoms in R_1, R_2, R_3, and R_4 is less than 16.

4,033,750

HERBICIDAL COMPOSITION

Hideo Hosaka, and Hiromi Yoneda, both of Oiso, Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Filed Sept. 4, 1975, Ser. No. 610,113

Claims priority, application Japan, Jan. 16, 1975, 50-6426; Sept. 14, 1974, 49-106538

Int. Cl.² A01N *9/22*

U.S. Cl. 71—90 **2 Claims**

1. A herbicidal composition comprising an inert carrier, and a herbicidally effective amount of a mixture of 1,3-dimethyl-3-(5-t-butylbenzothiazole-2-yl) urea and S-ethyl hexahydro-1H-

azepine-1-carbothioate in a urea-carbothioate ratio of 1:1 to 1:2 parts by weight.

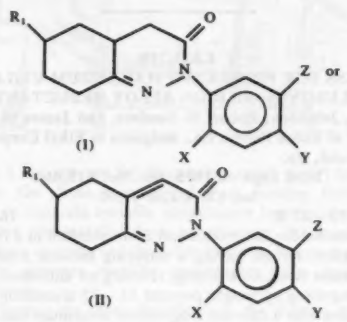
4,033,751

2-(SUBSTITUTED-PHENYL)-HEXAHYDRO- AND TETRAHYDRO-3-(2H)-CINNOLINONES AS HERBICIDES

James Volney Hay, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 20, 1976, Ser. No. 678,707
Int. Cl.² A01N 9/22; C07D 237/28
U.S. Cl. 71—92 21 Claims

1. A compound of the formulae:



(I)

(II)

wherein:
X is chlorine, fluorine, methyl, or trifluoromethyl:
Y is chlorine, fluorine, or bromine:
Z is hydrogen, chlorine, fluorine, or O—R_2;
R_1 is hydrogen or methyl; and
R_2 is alkyl of 1–3 carbon atoms.

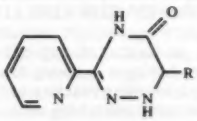
4,033,752

PYRIDYLTRIAZINONE COMPOUNDS

Shunichi Hashimoto, Takarazuka, and Osamu Kirino, Ashiya, both of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

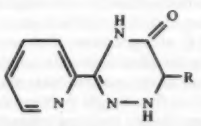
Filed Jan. 15, 1976, Ser. No. 649,319
Claims priority, application Japan, Jan. 21, 1975, 50-9543
Int. Cl.² C07D 253/06; A01N 9/22
U.S. Cl. 71—93 8 Claims

1. A herbicidal or fungicidal composition which comprises as an active ingredient a pyridyltriazinone compound of the formula:



wherein R is a hydrogen atom, an alkyl group having 1 to 5 carbon atoms, an alkoxycarbonylmethyl group wherein the alkoxy has 1 to 3 carbon atoms or a phenyl group.

7. A pyridyltriazinone compound of the formula:



wherein R is a hydrogen atom, an alkyl group having 1 to 5 carbon atoms, an alkoxycarbonylmethyl group wherein the alkoxy has 1 to 3 carbon atoms or a phenyl group.

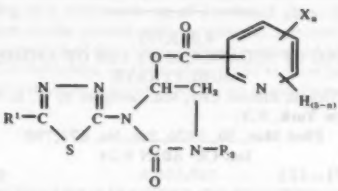
4,033,753

1-THIADIAZOLYL-5-PYRIDYLCARBONYLOX-YIMIDAZOLIDINONES

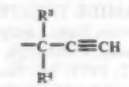
John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Apr. 5, 1976, Ser. No. 673,776
Int. Cl.² A01N 9/22; C07D 417/14
U.S. Cl. 71—94 10 Claims

1. A compound of the formula



wherein R^1 is selected from the group consisting of lower alkyl, cycloalkyl of from 3 to 7 carbon atoms, lower alkenyl, lower haloalkyl, lower alkoxy, lower alkylthio, lower alkylsulfonyl and lower alkylsulfinyl; R^2 is selected from the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and



wherein R^3 and R^4 are each selected from the group consisting of hydrogen and alkyl of up to 3 carbon atoms; X is selected from the group consisting of lower alkyl, chlorine and bromine; and *n* is an integer from 0 to 3.

10. A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim 1.

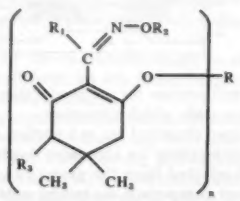
4,033,754

SUBSTITUTED CYCLOHEXENE ESTERS

Mikio Sawaki, Takaoka; Isao Iwataki, Odawara; Yoshihiko Hirono, Hiratsuka, and Hisao Ishikawa, Odawara, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 531,810, Dec. 11, 1974, Pat. No. 3,989,737. This application Jan. 19, 1976, Ser. No. 650,140
Claims priority, application Japan, Jan. 22, 1975, 50-8687; Mar. 31, 1975, 50-37884
Int. Cl.² A01N 9/20; C07C 69/76, 69/82, 69/83
U.S. Cl. 71—112 24 Claims

1. A compound of the general formula



wherein

R_1 is lower alkyl having six or less carbon atoms,
R_2 is selected from the group consisting of lower alkyl having six or less carbon atoms and lower alkenyl having six or less carbon atoms,
R_3 is selected from the group consisting of hydrogen and lower alkoxycarbonyl having six or less carbon atoms,
R is the residue of a benzene di- or tricarboxylic acid which may be substituted by alkyl or halogen, and
n is 2 or 3.

9. A herbicidal composition comprising an inert carrier and a herbicidally effective amount of a compound of claim 1.

17. A method for the control of weeds comprising applying a compound of claim 1 in an amount sufficient to exert herbicidal action to a locus to be protected.

4,033,755

RIPENING OF SUGARCANE BY USE OF AMMONIUM ISOBUTYRATE

Louis G. Nickell, Ellicott City, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed Mar. 30, 1976, Ser. No. 671,790
Int. Cl.² A01N *9/24*
U.S. Cl. 71—113 **5 Claims**

1. A process for increasing the sugar yield of grown sugarcane which comprises applying an effective amount of ammonium isobutyrate as a sugarcane ripening agent to the cane at a time at least about 2 and up to about 10 weeks prior to harvest.

4,033,756

DICHLOROACETAMIDE TREATED RICE SEEDS

Otto L. Hoffmann, Shawnee, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Sept. 17, 1971, Ser. No. 181,580
Int. Cl.² A01N *9/20*
U.S. Cl. 71—118 **1 Claim**

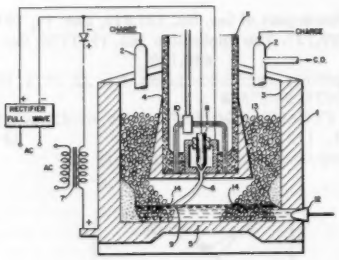
1. The method of protecting rice seed comprising applying thereon a coating of an effective but substantially nonphytotoxic quantity of an amide of dichloroacetic acid sufficient to improve resistance of the rice to a pre-emergent thiolcarbamate herbicide.

4,033,757

CARBOTHERMIC REDUCTION PROCESS

Robert Milton Kibby, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.

Filed Sept. 5, 1975, Ser. No. 610,684
Int. Cl.² C22B *21/02*
U.S. Cl. 75—10 R **4 Claims**



1. A carbothermic process for the production of aluminum from an aluminum oxide which comprises

A. striking an open electrical arc to a portion of the surface of a charge comprising an aluminum oxide and at least one material selected from the group consisting of carbon, aluminum compounds containing carbon, and mixtures thereof so as to form liquid aluminum and volatile products, with the proviso that only a small portion of the charge in the reaction zone is heated to reaction temperature while the majority of the charge in the reaction zone and the majority of the aluminum metal product is below reaction temperature at any given time;

B. causing said volatile products which are produced to pass through the charge and to further react and form liquid aluminum or compounds capable of forming said liquid aluminum at reaction temperature, and;

C. causing the liquid aluminum formed under the reaction conditions to flow away from the arc and over the nonreacted portions of the charge to be collected, said liquid aluminum containing no more than about 10 weight percent of aluminum carbide.

4,033,758

PROCESS FOR PRODUCING MAGNESIUM UTILIZING ALUMINUM-SILICON ALLOY REDUCTANT

James D. Johnston; Robert N. Sanders, and James M. Wood, Jr., all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Sept. 4, 1975, Ser. No. 610,464
Int. Cl.² C22B *45/00*
U.S. Cl. 75—67 R **16 Claims**

1. A process for the production of magnesium in a reaction-condensation system having a reducing furnace zone and a condensation zone, comprising; reacting an aluminum-silicon alloy comprising by weight percent 15 – 75 aluminum and 20 – 80 silicon with a calcium magnesium aluminum silicate slag or magnesium oxide in the presence of said slag in the reducing furnace zone or reaction zone at a temperature of about 1400° – 1650° C and a pressure of about 25 – 500 millimeters of mercury, the amount of magnesium oxide fed into the reaction zone being at least 101 percent of the amount theoretically required to react with the aluminum-silicon alloy fed into the reaction zone, maintaining the composition of the slag in amounts by weight percent of 42 – 65 **calcium oxide,** 1 – 11 magnesium oxide, 11 – 38 aluminum oxide and 5 – 19 silicon dioxide, evolving magnesium vapor from the reducing furnace zone or reaction zone to the condensation zone, and condensing and recovering the magnesium as a product.

4,033,759

PROCESS FOR PRODUCING MAGNESIUM UTILIZING ALUMINUM METAL REDUCTANT

James D. Johnston; Robert N. Sanders, and James M. Wood, Jr., all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Sept. 4, 1975, Ser. No. 610,430
Int. Cl.² C22B *45/00*
U.S. Cl. 75—67 R **18 Claims**

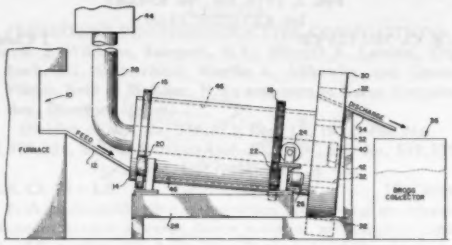
1. A process for production of magnesium in a reaction-condensation system having a reducing furnace zone and a condensation zone, comprising reacting in the reducing furnace zone aluminum metal containing at least 80 weight percent aluminum and a calcium magnesium aluminate slag or magnesium oxide in the presence of said slag containing not more than five weight percent silicon dioxide, the amount of magnesium oxide being fed into the reducing furnace zone being at least 110 percent of the amount required to react with the aluminum metal fed into the reaction zone and slag removed therefrom contain about 6 – 13 weight percent magnesium oxide, carrying out the reaction at a temperature of about 1350°–1700° C at a pressure of about 0.5 – 2.0 atmospheres, maintaining the silicon dioxide content and the magnesium oxide content of the molten oxide slag in the reaction zone at least as low as five weight percent and about 6 – 13 weight percent, respectively, evolving magnesium vapor from the reaction zone to the condensation zone, and condensing and recovering the magnesium as a product.

4,033,760

ALUMINUM DROSS RECOVERY METHOD

Richard T. Lance, and Pandelis N. Papafingos, both of Riverside, Calif., assignors to Alumax Mill Products, Inc., Riverside, Calif.

Filed Oct. 23, 1975, Ser. No. 625,286
Int. Cl.[2] C21B *3/04*
U.S. Cl. 75—68 R 1 Claim



1. In a dry process for recovering active metal from dross wherein the dross is removed from melting furnace and treated to separate metallic constituents from oxides, nitrides and other non-metallic dross constituents, the improvement comprising carrying out the following steps before treating the dross to separate metallic constituents from non-metallic constituents:

transferring the dross directly from the melting furnace to dry cooling means without substantial cooling enroute;

rotating the dross in the cooling means without water-dross contact in rolling contact with a cold cylindrical surface by lifting the dross from the lowermost point of said surface in contact with said surface and tumbling the dross back onto said surface; and

conveying the dross longitudinally along the length of said surface while carrying out the preceding step;

the combined action of the two preceding steps cooling the dross rapidly within no more than three minutes to less than 400° F., breaking the larger chunks of dross into smaller dross and preventing the formation of large chunks of dross by exothermic fusion, all without separation of substantial amounts of metallic constituent from the dross.

4,033,761

PROCESS FOR THE SEPARATION OF COPPER SULFIDE FROM METALLIC LEAD ENTRAINED IN A DROSS

Carl Richard DiMartini, Piscataway; William Lafayette Scott, Lebanon, and Leo James Bulvanoski, Fords, all of N.J., assignors to Asarco Incorporated, New York, N.Y.

Filed May 10, 1976, Ser. No. 684,802
Int. Cl.[2] C22B *13/02*
U.S. Cl. 75—77 10 Claims

1. A process for the separation of copper sulfide and, when present, metallic copper, from metallic lead entrained in a dross which comprises introducing the dross comprising copper sulfide and, when present, metallic copper, and metallic lead entrained therein into a vessel, introducing an alkali metal sulfide into said vessel, heating the resulting admixture of dross and alkali metal sulfide therein at an elevated temperature and for a time sufficient to melt together the dross and alkali metal sulfide, the molten dross releasing the entrained molten metallic lead, and molten copper sulfide of the molten dross and the molten alkali metal sulfide forming a low melting copper sulfide-alkali metal sulfide matte layer on the surface of a pool of the released molten lead, and separating the matte from the molten lead pool.

4,033,762

METHOD FOR PREVENTING OXIDATION OF MELTED METAL

Kozo Sato, No. 7-12, Minami 3-chome, Yamamato-cho, Yao, Osaka, Japan

Filed June 3, 1976, Ser. No. 692,578
Int. Cl.[2] C22B *9/00*
U.S. Cl. 75—96 5 Claims

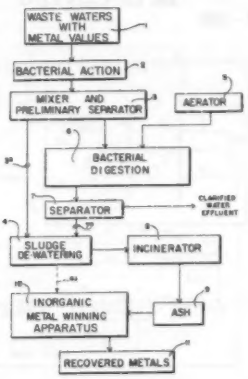
1. A method for preventing the oxidation of molten metal in a bath comprising the steps of (1) preparing a granular composition consisting of a mixture of relatively coarse, medium and fine globules ranging from about 0.5 mm to about 0.05 mm in size, whereby said coarse, medium and fine globules are present in substantially equal amounts, each of said globules consisting of a core made up of powdered glass, diatom and aluminum oxide coated with a material selected from the group consisting of aluminum and iron oxides and (2) depositing said composition on the molten metal to form partitioning layers thereover to separate the molten metal from the atmosphere.

4,033,763

PROCESS FOR RECOVERY OF SELECTED METAL VALUES FROM WASTE WATERS

Michael Markels, Jr., Springfield, Va., assignor to World Resources Company, McLean, Va.

Continuation-in-part of Ser. No. 622,783, Oct. 15, 1975, abandoned. This application Nov. 22, 1976, Ser. No. 743,745
Int. Cl.[2] C22B *15/00*, *11/08*
U.S. Cl. 75—97 R 16 Claims



1. The process of recovering selected metal values from waste waters in which said selected metal values appear in low concentrations on the order of 0.1–500 PPB, comprising the steps of:

a. mixing natural surface water, industrial waste water and organic waste together to form said waste waters;

b. capturing metal values from said waste waters by bacterial imbibing of said values to immobilize and concentrate the values into organic matter;

c. coagulating and de-watering said organic matter, thereby separating said organic matter as a sludge from the waste waters;

d. burning off the de-watered sludge to eliminate organic matters and form an ash comprising metal values and residual contaminants;

e. separating certain ones of said metal values including said selected values by dissolving them and removing them from said ash while leaving undissolved others of said metal values and said contaminants; and

f. purifying said dissolved metal values to isolate and recover the selected metal values from said certain separated values.

4,033,764

RECOVERY OF METALS

Terence Dudley Colegate, Copthorne; Christopher Robert Farnworth, Thornton Heath, and Eric Joseph Davis, Birmingham, all of England, assignors to Laporte Industries Limited, London, England

Filed May 20, 1975, Ser. No. 579,295

Claims priority, application United Kingdom, May 21, 1974, 22640/74

Int. Cl.[2] C22B *43/00, 15/00, 26/00*

U.S. Cl. 423—24 16 Claims

1. A process for removing, from solution, ions of metals capable of forming coordination complexes comprising contacting the solution with a complexing agent comprising an inorganic substrate and covalent organic molecules of an onium compound chemically bonded to the substrate, the covalent organic molecules containing free coordinating groups, said inorganic substrate comprising a clay mineral of the smectite group and having a layered anionic lattice based on layers of linked SiO_4 tetrahedra.

4,033,765

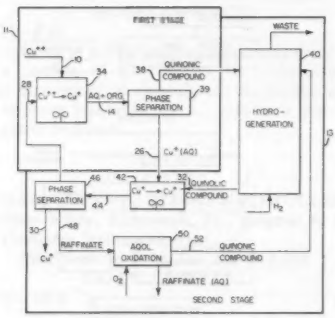
EXTRACTIONS OF COPPER FROM SOLUTIONS BY REDUCTION WITH ANTHRAQUINOLS

John N. Gerlach, Burlington, Mass., assignor to Kennecott Copper Corporation, New York, N.Y.

Filed Sept. 3, 1976, Ser. No. 720,414

Int. Cl.[2] C22B *15/12*

U.S. Cl. 75—108 14 Claims



1. A processs for producing copper metal from an aqueous ammoniacal cupric ion containing solution, said process being characterized by the steps of:

1. mixing a stoichiometric excess of a quinolic compound and an aqueous ammoniacal solution of cuprous ions in a first reactor to precipitate copper metal and to oxidize part of said quinolic compound to a quinonic compound, the remaining quinolic compound and the produced quinonic compound being dissolved in a substantially water immiscible solvent;
2. separating said water immiscible solvent from the copper metal and the aqueous solution;
3. mixing the immiscible solvent containing the remaining quinolic compound which is separated in step 2 with an ammoniacal solution of cupric ions in a second reactor to enable said quinolic compound to reduce said cupric ions to cuprous ions and to produce further quinonic compound;
4. separating the immiscible solvent from the solution of cuprous ions produced in step 3; and
5. adding the solution of cuprous ions separated in step 4 to said first reactor and repeating step (1).

4,033,766

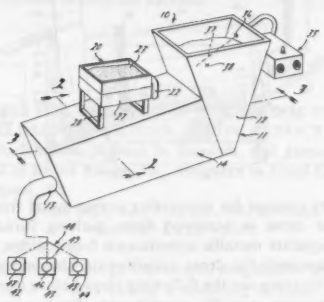
CONTINUOUS STREAM TREATMENT OF DUCTILE IRON

Gerald S. Cole, Dearborn; Bela V. Kovacs; Robert A. Sensoli, both of Dearborn Heights, and Herschel B. Smartt, Plymouth, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 569,029, April 17, 1975. This application Feb. 2, 1976, Ser. No. 654,663

Int. Cl.[2] C22C *33/00*

U.S. Cl. 75—123 CB 1 Claim



1. A nodularized cast iron article consisting essentially of 3.5 carbon, 2–2.5% silicon, the carbon/silicon ratio being about 7:5, about 0.6 manganese, sulfur being no greater than 0.015%, 0.04–055% magnesium, the remainder being essentially iron, said composition being particularly characterized by the absence of carbides and dross, at least 90% of graphite nodules are spherical in shape, and has a graphite nodule count of at least 400 per square millimeter in a ½ inch section.

4,033,767

DUCTILE CORROSION RESISTANT ALLOY

Thomas E. Johnson, Sullivan, Wis., assignor to Chas. S. Lewis & Co., Inc., Afton, Mo.

Filed Sept. 19, 1975, Ser. No. 614,871

Int. Cl.[2] C22C *19/03*

U.S. Cl. 75—170 16 Claims

1. In a corrosion resistant nickel base austenitic alloy, having improved malleability and ductility, the improvement consisting essentially of a silicon content of up to about 4%, a molybdenum content of up to about 4% and wherein the sum of the molybdenum and silicon content is less than about 4%, the combination producing improved malleability and hot ductility.

4,033,768

METHOD FOR THE PREPARATION OF AN ELECTROSTATOGRAPHIC PHOTOSENSITIVE DEVICE

Francis J. Wieloch, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 14, 1976, Ser. No. 676,841

Int. Cl.[2] G03G *5/04*

U.S. Cl. 96—1.5 12 Claims

1. A method for the preparation of a seamless belt useful as the photosensitive element in an electrostatographic copying device which comprises:

a. applying a film of soluble material over a mandrel;
b. applying a photoconductive layer over the soluble film and heat treating the photoconductive layer;
c. applying a layer of conductive material over the photosensitive layer;
d. applying a seamless shrink film of a thermoplastic resin over the layer of conductive material to form a layered, endless belt;
e. removing the layered belt from the mandrel;

f. contacting the belt with a solvent for the soluble film to thereby dissolve the film; and

g. turning the belt inside out to provide a belt having layers from the bottom up of the polymeric film, the conductive material and the photoconductive layer.

4,033,769

PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS

David J. Williams, Fairport, N.Y.; Marcel A. Lardon, Trubach, SG, Switzerland; Martin A. Abkowitz, and Gustav Pfister, both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 316,152, Dec. 18, 1972, Pat. No. 3,879,201. This application Oct. 30, 1974, Ser. No. 519,329

Int. Cl.² G03G *5/00*

U.S. Cl. 96—1.5 18 Claims

1. A photoconductive composition comprising an organic photoconductive electron donor material, an activator capable of formation of a charge transfer complex with said photoconductive material and a protonic acid having an aqueous dissociation constant of at least 10^{-4}, said acid being present in sufficient concentration in relation to the activator to enhance the stability of a complex formed during illumination between the anion radical form of the activator and a proton and thus extend the elevated level of conductivity of the composition in these light struck areas subsequent to illumination.

4,033,770

PRODUCTION OF ADHESIVE TRANSFERS BY DIFFUSION TRANSFER

Louis Maria De Haes, Edegem; Leon Louis Vermeulen, Broechem; Hugo Karel Gevers, Edegem, and Walter Frans De Winter, Gravenwezel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Apr. 4, 1975, Ser. No. 565,249

Claims priority, application United Kingdom, Apr. 11, 1974, 16212/74

Int. Cl.² G03C *11/12*, *5/54*, *7/00*; B44C *3/00*

U.S. Cl. 96—28 23 Claims

1. A process for the production of transfer images comprising the steps of:

1. photographically exposing a photographic material carrying a light-sensitive silver halide emulsion layer;

2. contacting the emulsion layer side of the exposed photographic material with a supported image-receiving layer of an image-receiving material, said image-receiving layer containing developing or precipitating nuclei, in the presence of a developing liquid for the exposed silver halide and a silver halide solvent to diffuse developed silver halide image-wise from the photographic material into the receiving layer to form therein a visible silver image;

3. separating the exposed and developed photographic material from the receiving layer carrying said visible silver image;

4. pressing said receiving layer carrying said visible image at least partly into contact with a receptor material, said image-receiving layer comprising a mixture of a hydrophilic colloid, a thermoplastic latex, and at least one of a plasticizer or a tackifying resin, and being adapted to undergo an increase in sticking power upon the application of pressure and optionally with heat and/or solvents sufficient to make the pressure-receiving regions of said image-receiving layer remain adhered on the receptor material upon separation of the image-receiving material from the receptor material; and

5. separating said image-receiving material from the receptor material to leave at least a portion of the pressure-receiving regions of said image-receiving layer upon said receptor material.

4,033,771

STABILIZED BLEACH-FIXING BATHS

Gary L. Borton, Penfield; Cobb S. Goff, Rochester, and Richard J. Malloy, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 16, 1973, Ser. No. 389,063

Int. Cl.² G03C *5/32*

U.S. Cl. 96—60 BF 27 Claims

1. A bleach-fix composition for use in photographic processing, comprising

1. a bleaching agent which is an iron or cobalt complex of a polycarboxylic acid,

2. a thiosulfate fixing agent, and

3. an amount sufficient to retard sulfurization of said bleach-fix composition of a carbonyl bisulfite adduct comprising at least two carbon atoms.

4,033,772

AMPHOTERIC MALEIC ANHYDRIDE COPOLYMERS AND PHOTOGRAPHIC EMULSIONS EMPLOYING THE SAME

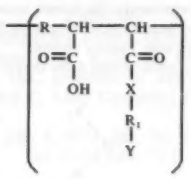
Joseph A. Sprung, Binghamton; Theodore Panasik, Vestal, and James J. Holmes, Endicott, all of N.Y., assignors to GAF Corporation, New York, N.Y.

Filed Dec. 9, 1975, Ser. No. 639,075

Int. Cl.² G03C *1/72*, *1/02*

U.S. Cl. 96—114 42 Claims

1. A photographic silver halide emulsion, wherein the emulsion binder comprises a water-soluble, film-forming amphoteric copolymer having in its molecule repeating units of the general formula:



where

n is a positive integer;

R is the residue of an ethylenically unsaturated organic monomer;

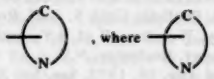
X is

—S— or —O—, where R_2 is hydrogen or lower alkyl;

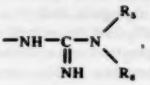
R_1 is lower alkylene, lower alkylene substituted by halogen, alkoxy or carboxy, cycloalkylene of 3 to 8 carbon atoms, or phenylene; and

Y is

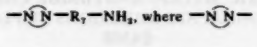
where R_3 and R_4 are each hydrogen, lower alkyl or lower alkyl substituted by amino, or R_3 and R_4 together with the nitrogen atom to which they are attached form a 3- 8-membered saturated or unsaturated heterocyclic ring containing the nitrogen atom as the sole hetero atom or containing a second hetero atom selected from nitrogen, oxygen or sulfur,



represents a 3-to 8-membered saturated or unsaturated heterocyclic ring containing the nitrogen atom in the ring as the sole hetero atom or containing a second hetero atom selected from nitrogen, oxygen or sulfur,



where R_3 and R_4 are each hydrogen or lower alkyl,



represents a 3- to 8-membered saturated or unsaturated heterocyclic ring containing the two nitrogen atoms as the sole heteroatoms and R_7 is lower alkylene, or $-SR_8$, where R_8 is hydrogen or lower alkyl;

or, when X is as defined above and Y is

or $-SR_8$, R_1 represents the atoms necessary to form a 3- to 8-membered heterocyclic ring with X and Y containing X and Y as the sole hetero atoms;

and the quaternary ammonium salts thereof when Y is

where R_3 and R_4 are lower alkyl or the ternary sulfonium salts thereof when Y is $-S-R_8$, where R_8 is lower alkyl.

4,033,773

RADIATION PRODUCED COLORED PHOTOPOLYMER SYSTEMS

James Marvin Lewis, Aurora, and Raymond Willis Newycar, Willoughby, both of Ohio, assignors to Horizons Incorporated, a division of Horizons Research Incorporated, Cleveland, Ohio

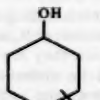
Division of Ser. No. 500,931, Aug. 27, 1974, Pat. No. 3,954,468. This application Feb. 9, 1976, Ser. No. 656,260

Int. Cl.² G03C *1/68*

U.S. Cl. 96—115 P **7 Claims**

1. A colored photosensitive composition suitable for use in the production of colored images, consisting essentially of:

1. at least one N-vinyl monomer
2. an iodine containing activator selected from the group consisting of alkyl iodides, sulfenyl iodides and sulfonyl iodides;
3. a phenolic compound represented by the formula



where n is an integer up to 5 and Q represents monovalent radicals selected from the group consisting of hydroxyl, amino, alkyl and allyl;

4. at least one acid leachable dye selected from the group consisting of
   a. substituted anthraquinones
   b. binuclear merocyanines
   c. complex merocyanines
   d. cyanines
   e. 9-phenyl-fluoren-9-ols; and
5. and alcohol soluble, acid insoluble resin binder;

each of the above constitutents being dispersed or disolved in said resin binder, the amount of leachable dye being sufficient to impart a distinct color to the photosensitive composition and the above constitutents being present in the following relative proportions, by weight:

N-vinyl monomer: 100 to 300
iodine containing activator: 15 to 300
phenolic compound: up to 100
acid leachable dye: 0.005 to 5.

4,033,774

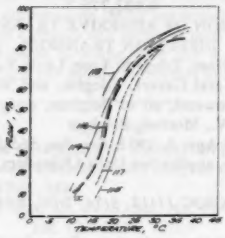
DENTAL IMPRESSION COMPOUND

Paul A. Johnson, 14040 N. Birchwood Lane, Mequon, Wis. 53092, and Hamilton A. Pinkalla, 7656 W. Forest Home Ave., Milwaukee, Wis. 53220

Filed Apr. 8, 1976, Ser. No. 675,047

Int. Cl.² C08L *93/04*; C09K *3/00*

U.S. Cl. 106—35 **4 Claims**



1. A dental impression composition consisting essentially of a mixture by weight of hydrogenated wood rosin 65.5 to 91.0 percent; white petrolatum 4.0 to 9.5 percent; talc 0 to 20 percent; aluminum powder 5 to 25 percent; total talc and aluminum 5 to 25 percent.

4,033,775

PROCESS FOR PRODUCING ALUMINOUS KEATITE CERAMICS

David G. Grossman, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Sept. 20, 1976, Ser. No. 724,985

Int. Cl.² C03C *3/22, 21/00, 3/04*

U.S. Cl. 106—39.7 **4 Claims**

1. In a process for the manufacture of an aluminous keatite-containing ceramic article wherein a ceramic article selected for treatment, comprising a principal crystal phase composed of beta-spodumene solid solution, is first contacted with a strong acid to replace at least some of the lithium ions therein with hydrogen, and thereafter heated to provide aluminous keatite through the removal of at least some of the water of crystallization therefrom, the improvement which comprises selecting as the ceramic article for treatment an article wherein the mole ratio of Al_2O_3 to modifying oxides selected from the group consisting of Li_2O, Na_2O, K_2O, ZnO, MgO, CaO, BaO and SrO does not exceed about 1:1.

4,033,776

COMPOSITION OF CERAMIC MATERIAL

William R. Golya, and John Doornwaard, both of Gibsonia, Pa., assignors to Saxonburg Ceramics, Inc., Saxonburg, Pa.

Filed Aug. 18, 1975, Ser. No. 605,349
Int. Cl.² C04B 33/26
U.S. Cl. 106—46 2 Claims

1. A ceramic composition for forming an expanded glass-like seal upon heating, comprising about 26% kaolin, about 25% silica, about 16% zircon, about 29% of frit, about 4% of borate, by weight of the whole, the chemical composition of said components being as shown in the following table, in percentages by weight:

	Kaolin	Silica	Zircon	Frit	Borate
SiO_2	52.40	99.89		31.49	
Al_2O_3	44.65	.08	.30	13.20	
Fe_2O_3	.44	.02	.04		
TiO_2	1.81	.01	.20		
CaO	.09			15.80	38.22
MgO	.19				
Na_2O	.33			7.96	9.83
K_2O	.09				
B_2O_3				31.55	51.94
$ZrSiO_4$			99.46		

4,033,777

SODIUM SPECIFIC GLASS COMPOSITIONS AND ELECTRODES

Chung Chang Young, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 511,720, Oct. 3, 1974, Pat. No. 3,988,237.
This application May 24, 1976, Ser. No. 689,310
Int. Cl.² C03C 3/04, 3/30
U.S. Cl. 106—52 20 Claims

1. A glass composition for use in ion selective glass electrodes consisting essentially of:

Component	Mole %
Na_2O	5–25%
Al_2O_3	0–20%
Ta_2O_5	1–10%
SiO_2	60–82%
wherein $\frac{Ta_2O_5 + Al_2O_3}{Na_2O}$	$\geq$ 0.2

4,033,778

PROCESS FOR MAKING MAGNESIA

William Cecil Gilpin, Welbeck Woodhouse, near Worksop; Noel Heasman, The Grove, near Hartlepool, and John Williamson, Hart, near Hartlepool, all of England, assignors to Steetley Limited, England

Continuation of Ser. No. 308,603, Nov. 21, 1972, abandoned.
This application May 9, 1975, Ser. No. 576,208
Claims priority, application United Kingdom, Dec. 1, 1971, 55820/71; Apr. 4, 1972, 15482/72
Int. Cl.² C04B 35/04
U.S. Cl. 106—58 13 Claims

1. In a process for producing a refractory material in which an aqueous suspension of magnesium hydroxide is dewatered and the dewatered solid thus obtained is calcined to form the desired refractory, the improvement which comprises dewatering the aqueous suspension of the magnesium hydroxide at a pressure which is greater than 400 lbs per square inch to give a cake of magnesium hydroxide containing at least 67.5% by weight of solids and having a green bulk density of at least 1.15 grams/cc.

4,033,779

NON-EQUILIBRIUM CORDIERITE-ALUMINA

Ernel R. Winkler, Scottsdale, Ariz., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,689
Int. Cl.² C04B 35/18, 35/20; C03C 3/22
U.S. Cl. 106—62 3 Claims

1. A non-equilibrium sintered ceramic composition consisting essentially of a fine-grained matrix of crystalline cordierite and an effective amount up to about 70%, by weight based on the matrix weight of undissolved, 25–149 micron diameter alumina particles with an average particle size of between about 40 and 60 microns, for increasing the temporary use temperature of the matrix without increasing the coefficients of thermal expansion of the composition proportionally to the added alumina.

4,033,780

METHOD OF ENHANCING THE REFRACTORINESS OF HIGH PURITY FUSED SILICA

Charles E. Baumgartner, and Peter P. Bihuniak, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,459
Int. Cl.² C04B 35/14
U.S. Cl. 106—69 6 Claims

1. In a method of producing a high purity fused silica product, wherein a liquid containing silica is dried to form solid silica bodies which are then thermally vitrified, the improvement, whereby the refractoriness of the fused silica is enhanced, which comprises doping a liquid flowable form of silica slurry or sol with 200 to 2500 parts per million by weight, as based on the fused silica, of elemental silicon.

4,033,781

FIBER REINFORCED STRUCTURAL MATERIAL

Karl V. Hauser, Ann Arbor, Mich., and Edwin W. Ronsaville, Jr., Annapolis, Md., assignors to Amtech, Inc., Odenton, Md. and Edward C. Levy Company, Detroit, Mich., part interest to each

Filed Jan. 9, 1976, Ser. No. 647,883
Int. Cl.² C04B 7/35
U.S. Cl. 106—90 6 Claims

1. A structural material comprising a hardenable hydraulic-setting matrix and a plurality of randomly arranged elongated elements admixed in said matrix, said elements being fabricated of a non-metallic substance, the elements as a group extending in all directions in the formed and set matrix, each element having a cross section with a central area and a plurality of arms extending outwardly from said area, each element cross section being further provided with lobes on the outer ends of said arms.

4,033,782

CALCIUM ALUMINATE CEMENT COMPOSITIONS AND MIXES AND METHOD FOR PREPARING THEM

James Allen Ray, Mantua, and Thomas Joseph Lazio, Solon, both of Ohio, assignors to Martin Marietta Corporation, Bethesda, Md.

Filed Mar. 23, 1976, Ser. No. 669,734
Int. Cl.² C04B 7/02, 13/20
U.S. Cl. 106—104 37 Claims

1. A hydraulic cement composition comprising: calcium aluminate cement, aggregate material in amount within the range of to about 85% by weight based on the total weight of the dry cement and aggregate material, and additive material comprising calcium formate in at least an amount (a) which accelerates the rate of gain of compressive strength of the hydrated product, formed within the first six hours after water for hydraulic setting of the cement is added to said composition, materially over the rate of gain of compressive strength of the hydrated product formed from a similar composition without calcium formate and (b) which provides, when in-

cluded in a Standard Cement Mortar Mix containing said cement, a final setting time of about 7 to about 35 minutes after inclusion of water prescribed for said Standard Cement Mortar Mix as determined at about 70° F. by the appropriate Designated Test Method for mortars.

4,033,783
METHOD FOR MAKING LIME-SILICA INSULATION FROM PERLITE

Franz J. Brodmann, and Richard D. Varker, both of Philadelphia, Pa., assignors to General Refractories Company, Bala Cynwyd, Pa.

Filed June 23, 1975, Ser. No. 589,571
Int. Cl.² C04B *1/00*
U.S. Cl. 106—120 **13 Claims**

1. A method of making lime-silica bonded structural materials suitable for use for insulation purposes comprising the steps of:

a. mixing particles of expanded perlite surface activated to accelerate gel formation with an aqueous slurry comprising lime and reinforcement fibers to form an aqueous lime-silica reaction mixture, the relative proportion by weight of perlite and lime being adjusted to provide a C/S ratio greater than about 0.70 and less than about 0.80;

b. heat treating the aqueous lime-silica reaction mixture to form a lime-silica gel;

c. shaping the lime-silica gel to form a lime-silica shaped article;

d. curing the lime-silica shaped article by treating the article in steam; and

e. drying the cured lime-silica shaped article to remove excess moisture.

4,033,784
METHOD FOR DISSOLVING ASPHALTIC MATERIAL

Michael B. Lawson, and Kenneth J. Snyder, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Aug. 25, 1975, Ser. No. 607,653
Int. Cl.² B08B *3/08*
U.S. Cl. 134—20 **12 Claims**

1. A method for dissolving asphaltic material comprising:

establishing contact between said asphaltic material and a composition comprising a liquid aromatic solvent and an additive material soluble in said liquid aromatic solvent, and

maintaining said contact for a time sufficient to dissolve said asphaltic material;

wherein said liquid aromatic solvent has a flash point of at least about 160° F and is a mixture of aromatic compounds selected from alkyl substituted benzene compounds having 1 to 10 carbon atoms per alkyl substituent, naphthalene, and alkyl substituted naphthalene having 1 to 10 carbon atoms per alkyl substituent; and

wherein said additive material is benzotriazole and is, present in said composition in the range of from about 0.1 to about 50 percent by weight of said liquid aromatic solvent.

4,033,785
AIR WIPE

Charles D. Gibbs, 1406 Greenville Highway, Hendersonville, N.C. 28739

Filed Mar. 4, 1976, Ser. No. 663,657
Int. Cl.² B08B *1/02*
U.S. Cl. 134—15 **14 Claims**

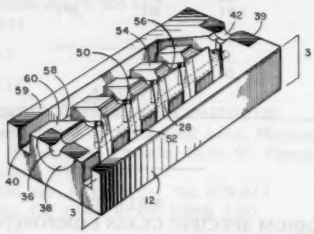
1. An air wipe to remove adhering particulate matter from a linearly drawn passing article of indefinite length having article entrance and exit orifices and opposing tandem jet stream orifices, within mating housing halves, directing impinging pressurized jet streams upon said article passing through an annular central housing passage comprising:

a plurality of transverse extrusion channels defined by corresponding V-shaped swept baffle means, swept obliquely with respect to the direction of article travel, each extrusion channel having opposing tandem jet stream orifices, to divert particulate laden dispersed jet streams at a lateral acute angle, with respect to said passing article, in a direction opposing the direction of movement of said article;

longitudinal exhaust channels coaxial with said central article passage communicating and merging with said extrusion channels and terminating in exhaust ports adjacent to, but displaced from, said article entrance orifice to divert said particulate laden dispersed jet streams away from said entering linearly drawn article;

said jet streams impinging upon said article at an angle less than 90° **and said opposing tandem jet stream orifices placed** 180° **apart;**

said swept baffle means having a machined annular groove, for passage of said wire, at the apex of said baffle means, the convergence of the arms of said baffle means being



said apex, with said linear article forming an acute angle with respect to said baffle means swept arms.

14. A method for the incremental removal and diversion of adhering particulate matter from a continuously running linearly drawn wire whereby high velocity jet streams impinge upon said passing wire, the method comprising:

impinging said passing wire with a plurality of high velocity paired opposing concentrated jet streams, said pairs being linearly displaced along the line of wire travel and impinging upon said wire at an acute angle, to the line of wire travel;

diverting particulate laden dispersed jet streams laterally through angular transverse extrusion channels, said channels being symmetrical on either side of the line of said passing wire; and

exhausting said particulate laden dispersed jet stream away from said wire through longitudinal exhaust channels coaxial with the line of wire travel in a direction opposing the line of wire travel.

4,033,786
TEMPERATURE GRADIENT ZONE MELTING UTILIZING SELECTIVE RADIATION COATINGS

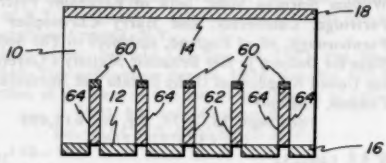
Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 30, 1976, Ser. No. 718,975
Int. Cl.² H01L *21/225*
U.S. Cl. 148—1.5 **17 Claims**

1. An improvement in the processing of a body of semiconductor material by thermal gradient zone melting comprising the steps of:

a. selecting a body of semiconductor material having a preferred crystal structure, a preferred type of conductivity, a preferred level of resistivity, two major opposed surfaces being, respectively, the top and bottom surfaces of the body, at least one of the major surfaces having a preferred planar crystal orientation, and a vertical axis substantially aligned with a first preferred crystal axis of the material of the body;

b. forming a layer of a material suitable for absorbing a predetermined range of wavelength of the radiation spectrum impinging thereupon on at least one of the two



major opposed surfaces, the layer having a predetermined thickness, t, expressed by the following general equation:

$$t = \frac{(2n-1)\lambda}{4N}$$

wherein

n = any positive integer greater than zero

λ = the wavelength of the most intense portion of radiation spectrum impinging upon the material in vacuum and

N = the index of refraction of the material;

c. exposing the processed body to a source of radiant energy;

d. absorbing the predetermined range of wavelength of the most intense portion of the spectrum in the layer of material, and

e. increasing the heat flow lines through the material of the body to enhance the migration of a melt of metal-rich semiconductor through the body by thermal gradient zone melting.

4,033,787

FABRICATION OF SEMICONDUCTOR DEVICES UTILIZING ION IMPLANTATION

James F. Marshall, St. Paul, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 619,866, Oct. 6, 1975, abandoned. This application Oct. 1, 1976, Ser. No. 728,564

Int. Cl.² H01L *21/265, 27/20*

U.S. Cl. 148—1.5 **30 Claims**

1. A method for providing semiconductor material stress sensor having structural portions including substantially a diaphragm and a constraint for constraining said diaphragm at peripheral portions thereof, said method comprising:

providing a layer of semiconductor material initially of a first conductivity type; and

implanting ions of a first kind in said layer through a first surface portion thereof to form, after annealing, a first region of a second conductivity type located at least in part in a portion of said layer which will be included in said diaphragm to serve as a piezoresistor, said part of said first region as located being confined to interior portions of said layer with respect to said first surface portion such that a first semiconductor junction separates said part of said first region from remaining portions of said layer with said part of said first region having therein what, before annealing, is a region of maximum concentration of said first kind ions spaced apart from at least a first portion of said first semiconductor junction where said first portion of said first semiconductor junction occurs between said first surface portion and said region of maximum first kind ion concentration.

4,033,788

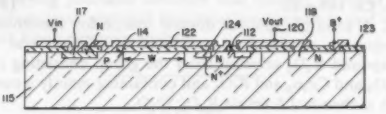
ION IMPLANTED GALLIUM ARSENIDE SEMICONDUCTOR DEVICES FABRICATED IN SEMI-INSULATING GALLIUM ARSENIDE SUBSTRATES

Robert G. Hunsperger, Malibu, and Nathan Hirsch, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 423,325, Dec. 10, 1973, Pat. No. 3,914,784. This application Aug. 22, 1975, Ser. No. 607,071

Int. Cl.² H01L *21/26*

U.S. Cl. 148—1.5 **11 Claims**



1. A process for fabricating an electrically active component within an electrically isolating substrate which includes the steps of:

a. providing a GaAs semi-insulating substrate having a bulk resistivity in the range of 10^6–10^8 ohm.centimeters and having a dominant electrically active impurity of chromium present in at least about 0.01 parts per million,

b. forming an ion implantation mask having an opening therein on the surface of said substrate,

c. projecting N-type ions through said opening in said mask to form an ion implanted region in said substrate,

d. forming an insulating coating over the surface area of said substrate through which said N-type ions were projected,

e. annealing the structure in (d) above at a predetermined elevated temperature and time sufficient to electrically activate said N-type ions implanted in said substrate and to raise the carrier mobilities therein to at least about 3000 cm^2/volt·second, and

f. forming ohmic contacts at speed-apart areas of said implanted region, whereby an implanted resistor region is fabricated and electrically isolated in a single semi-insulating substrate material.

4,033,789

METHOD OF PRODUCING A HIGH STRENGTH STEEL HAVING UNIFORM ELONGATION

Emil G. Hamburg, Pittsburgh; Robert L. Cryderman, McMurray, and John F. Butler, Bethel Park, all of Pa., assignors to Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Filed Mar. 19, 1976, Ser. No. 668,374

Int. Cl.² C21D *6/00, 7/14*

U.S. Cl. 148—12 F **7 Claims**

1. A method of heat treating steel to produce a high strength product having high tensile uniform elongation, comprising:

a. heating a steel product having a composition consisting essentially of from 0.04 to 0.17% carbon, 0.8 to 2.0% manganese, up to 1.0% silicon, up to 0.12% vanadium, up to 0.1% columbium, up to an effective amount of titanium to form titanium carbo-nitrides, 0.001 to 0.025% nitrogen, balance iron to a temperature above the Ac_3 temperature of the steel for a time sufficient to austenitize said steel product;

b. cooling said austenitized steel product at a rate of no more than about 70° to about 850° F; and

c. cooling said steel product at a rate of more than about 10° from 850° F to obtain a high-treated steel product having a minimum ultimate tensile strength of 80,000 p.s.i., a minimum tensile uniform elongation of 16%, and a micro-

structure of from about 10% to 35% MLB, balance essentially proeutectoid ferrite.

4,033,790

SOLID DIFFUSION DOPANTS FOR SEMICONDUCTORS AND METHOD OF MAKING THE SAME

Koreaki Gunjigake, Machida; Masashi Hasegawa; Hiroshi Oizumi, both of Sagamihara, and Yoshio Ogata, Machida, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 29, 1976, Ser. No. 709,815
Int. Cl.² C04B *35/40;* H01L *21/223*
U.S. Cl. 148—22 13 Claims

1. A solid phosphorus dopant source for semiconductors, comprising a substance composed of at least one kind of compound R_2O_3 selected from the group consisting of Y_2O_3, La_2O_3 and Ce_2O_3 and P_2O_5 and containing mainly a compound with a chemical formula $R_2O_3 \cdot 5P_2O_5$.

4,033,791

MAGNETOSTRICTIVE ALLOY

Zbigniew Kaczkowski, Warsaw, Poland, assignor to Polska Akademia Nauk, Instytut Fizyki, Warsaw, Poland

Filed Jan. 6, 1976, Ser. No. 646,932
Claims priority, application Poland, Jan. 22, 1975, 177485
Int. Cl.² C04B *35/00;* C22C *38/06*
U.S. Cl. 148—31.55 6 Claims

1. A processed alloy having magnetostrictive properties and suitable for the production of magnetostrictive cores for magnetostrictive ultrasonic transducers,

said alloy consisting essentially of iron as a major ingredient and 5 to 15% aluminum and 0.5 to 10% cobalt as additive ingredients,

said alloy being further characterized by having a value of k_m between 0.32 and 0.38.

4,033,792

COMPOSITE SINGLE CRYSTAL ARTICLE

Anthony F. Giamei, Middletown, and Bernard H. Kear, Madison, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 536,043, Dec. 23, 1974, Pat. No. 3,967,355. This application Apr. 7, 1976, Ser. No. 674,694
Int. Cl.² B23K *28/00*
U.S. Cl. 148—32 3 Claims

1. A metallic composite blade for use in gas turbine engines, for applications where at least a portion of the blade is exposed to a corrosive environment, including

a. a high strength single crystal core element

b. at least one oxidation resistant single crystal element bonded to the core element so as to protect the core from the corrosive environment

c. a base element bonded to the core element

wherein the following relationship is maintained between all bonded adjacent single crystal elements

a. the crystal structure types are substantially identical

b. the lattice parameters are substantially identical

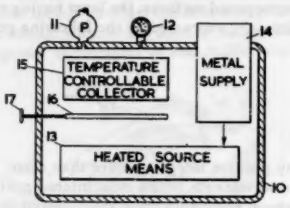
c. the orientations are substantially identical so that there are no mobile high angle grain boundaries between the bonded single crystal elements.

4,033,793

ALUMINIUM ALLOYS

Robert Lewis Bickerdike, Alton; Douglas Clark, Camberley; John Norman Eastabrook, Basingstoke; Garyth Hughes; William Norman Mair, both of Farnham; Peter George Partridge, Camberley, and Harry Christopher Ranson, Farnborough, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Sept. 15, 1975, Ser. No. 613,498
Int. Cl.² C22C *21/00*
U.S. Cl. 148—32 10 Claims



1. an evaporation-condensation aluminum alloy which consists of 2 to 12% by weight of chromium, 0.2 to 3.0% by weight of iron, the balance being aluminum apart from minor proportions of impurities and incidental elements wherein most of the chromium is present as a metastable solution in the aluminum lattice in the form of grains having one dimension of 5 μm or less, said grains containing a precipitate phase of iron-rich zones the major proportion of which have dimensions of 200A or less, the presence of large intermetallic particles, particularly at grain boundaries, being at a minimum.

4,033,794

ALUMINIUM BASE ALLOYS

Michael James Stowell, Saffron Walden; Brian Michael Watts, Haverhill; Edward Frederick Emley, Chalfont St. Giles, and Roger Grimes, Amersham, all of England, assignors to The British Aluminum Company, Limited, London and T. I. (Group Services) Limited, Birmingham, both of, England

Continuation of Ser. No. 433,618, Jan. 15, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 567,505
Claims priority, application United Kingdom, Jan. 19, 1973, 2846/73
Int. Cl.² C22C *21/00*
U.S. Cl. 148—32 14 Claims

1. A superplastically deformable wrought aluminium-base alloy consisting of

1. non-heat treatable aluminium-base alloy selected from the group consisting of

1a. aluminium of normal commercial purity together with 0.4% to 2% iron and 0.4% to 2% silicon as dynamic recrystallization modifying additives to achieve fine structure during deformation,

1b. aluminium and 0.75% to 2.5% manganese together with 0.4% to 1% iron as dynamic recrystallization additive to achieve fine structure during deformation,

1c. aluminium and 0.25% to 0.75% manganese, and

1d. aluminium and 1% to 4% magnesium together with 0.25 to 0.75% manganese as dynamic recrystallization additive to achieve fine structure during deformation, and

2. zirconium in an amount of 0.3% to 1.0% in total content of which at least 0.3% is present in solid solution;

3. the remainder of said superplastically deformable alloy being normal impurities and incidental elements known to be incorporated in said aluminium-base alloys.

4,033,795
METHOD FOR INDUCING UNIAXIAL MAGNETIC ANISOTROPY IN AN AMORPHOUS FERROMAGNETIC ALLOY

Brian S. Berry, Ossining, and Walter C. Pritchet, Mahopac, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 214,127, Dec. 30, 1971, Pat. No. 3,820,040. This application June 4, 1974, Ser. No. 476,641
The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.
Int. Cl.² C21D *1/04*; H03B *5/30*
U.S. Cl. 148—108 **6 Claims**

1. Method for inducing uniaxial magnetic anisotropy in an amorphous ferromagnetic alloy, comprising the steps of:

providing an amorphous ferromagnetic alloy with substantially amorphous structure such as that producible by the method of splat cooling, and

magnetically annealing said alloy for times and temperatures confined to values which do not produce substantial crystallization therein, said magnetic annealing comprising the steps of

applying an approximately saturating magnetic field to said alloy along a direction in which the easy axis of said uniaxial anisotropy is to be induced, with an accompanying

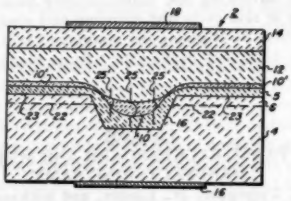
heating of said alloy to temperatures no higher than that at which said amorphous alloy exceeds its Curie point for a time period sufficient to induce said anisotropy in said alloy, and

cooling said alloy with said induced uniaxial magnetic anisotropy therein to room temperature, at a rate to yield a substantially amorphous structure.

4,033,796
METHOD OF MAKING BURIED-HETEROSTRUCTURE DIODE INJECTION LASER

Robert D. Burnham, and Donald R. Scifres, both of Los Altos, Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed June 23, 1975, Ser. No. 589,277
Int. Cl.² H01L *21/20*, *21/74*; H01S *3/06*
U.S. Cl. 148—175 **20 Claims**



1. A method of making a heterojunction diode laser comprising the steps of:

forming in a semiconductor single crystal material substrate of one conductivity type a surface layer of the second conductivity type to form a current blocking p-n junction when a bias is applied to the heterojunction hereinafter formed.

removing both a portion of said surface layer and an additional part of said substrate material adjacent thereto to provide an elongated groove in said substrate, said groove dividing said surface layer into distinct parts,

forming on the entire surface of said grooved surface of said substrate a first single crystal epitaxial layer of semiconductor material of said one conductivity type, with

formation of said first layer being concluded while the portion of the exposed surface of said first layer in said groove is concave,

forming on said first layer a second layer of a semiconductor material of higher index of refraction than that of said material of said first layer of either conductivity type, with formation of said second layer being concluded when the exposed surface of said second layer directly over the concave surface of said first layer is substantially flat to form a current carrying p-n junction when said junction in the groove is forward biased and the conductivity of said second layer is of a second conductivity type,

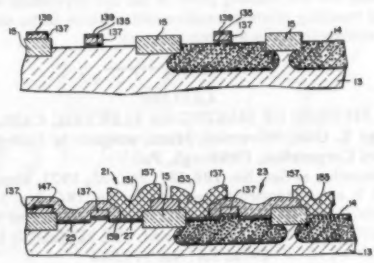
forming on said second layer a third layer of semiconductor material of lower index of refraction that that of said second layer and of a second conductivity type than that of said first layer to form a p-n junction when said second layer is of a conductivity type which is the same as said first layer, and

providing means for applying a bias voltage across the p-n junction formed in the groove such that the junction is forward biased when said bias voltage is applied and said rectifying junctions between said distinct parts of said surface layer and said first layer are reverse biased when said bias voltage is applied.

4,033,797
METHOD OF MANUFACTURING A COMPLEMENTARY METAL-INSULATION-SEMICONDUCTOR CIRCUIT

Hans G. Dill, Costa Mesa, and Thomas N. Toombs, Irvine, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 362,025, May 21, 1973, abandoned, which is a continuation of Ser. No. 147,093, May 26, 1971, abandoned. This application Apr. 23, 1975, Ser. No. 570,687
Int. Cl.² H01L *21/22*, *21/283*, *29/78*
U.S. Cl. 148—187 **2 Claims**



1. In the process of producing an SIS circuit having at least one N-channel and one P-channel device with interconnected gates in a surface of a semiconductor substrate of a given type of conductivity, the steps of:

a. forming an insulating layer on said surface, said layer having an opening therein for each of said devices;

b. forming a complementary substrate under one of said openings for one of said devices;

c. disposing a gate insulator of electrically insulating material on a portion of said substrate within each of said openings;

d. forming on said layer of insulating material a multi-layered strip comprising an integral strip of electrically conductive polycrystalline silicon doped to have a given type of conductivity to serve as interconnected gates for said devices and a dopant-impervious insulating layer covering said polycrystalline silicon strip; and

e. with said multi-layered strip and said insulating layer as a mask, successively doping selected spaced-apart areas within respective ones of said openings with mutually opposite conductivity type determining impurities to convert them into source and drain regions of opposite conductivity from the substrate immediately surrounding them, without changing the conductivity type of said silicon strip.

4,033,798

COMPLEX OF NITROCELLULOSE AS PROPELLANT

Bruce W. Brodman, Cornwells Heights; Michael P. Devine, Churchville, and Stuart Schwartz, Philadelphia, all of Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 29, 1976, Ser. No. 671,475
Int. Cl.² C06B *25/34*
U.S. Cl. 149—92 7 Claims

1. A chemical complex comprising nitrocellulose hydrogen-bonded to a member selected from the group of hexahydro-1,3,5-trinitro-s-triazine, octahydro-1,3,5,7-tetranitro-s-tetrazine, and mixtures thereof.

4,033,799

IONIC HYDROGENOLYSIS OF BINOR-S FOR USE AS A HIGH ENERGY FUEL

Abraham Schneider, Overbrook Hills, and Edward J. Janoski, Havertown, both of Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.

Filed May 16, 1975, Ser. No. 578,070
Int. Cl.² C06B *23/00*; B01J *35/00*; C07C *1/00*
U.S. Cl. 149—120 15 Claims

1. A method for the ionic hydrogenolysis of Binor-S comprising:

contacting Binor-S with hydrogen in the presence of a promoting amount of a promoter selected from the group consisting of hydrogen halide and an organic halide and an effective amount of a catalyst selected from the following group: palladium-on-carbon, palladium-on-alumina and Raney nickel; said contacting occurring at a temperature of about 50°–200° C. and at a pressure of about 100–10,000 p.s.i.g.,

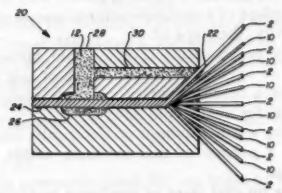
whereby the low melting point of the last crystalline material in the resulting mixture enables said mixture to be used as a high energy fuel at a low temperature.

4,033,800

METHOD OF MAKING AN ELECTRIC CABLE

George E. Ollis, Worcester, Mass., assignor to United States Steel Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 109,287, Jan. 25, 1971, abandoned, which is a continuation-in-part of Ser. No. 784, Jan. 5, 1970, Pat. No. 3,602,632, which is a continuation-in-part of Ser. No. 691,459, Dec. 18, 1967, abandoned. This application Dec. 29, 1972, Ser. No. 319,564
Int. Cl.² H01B *13/14*
U.S. Cl. 156—48 3 Claims



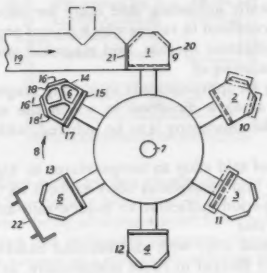
1. The method of making a stranded electric cable having a plastic composition in continuous and intimate contact with the individual conductors throughout the length of the cable which comprises twisting the conductors together and passing the conductors through a stranding die, said stranding die having a long narrow passageway sized for the desired dimension of plastic composition surrounding the stranded conductors, a chamber located intermediate the ends of the passageway and a funnel shaped entrance, while simultaneously applying a plastic under high pressure through a transverse opening in the die into the chamber and at the same time through part of the transverse opening to the surface of the funnel shaped entrance through a branch opening connecting the transverse opening and the funnel shaped entrance.

4,033,801

MANUFACTURE OF ARTICLES OF A SUBSTANTIALLY SACK-LIKE OR TUBULAR STRUCTURE

Eugene Gros, 9 Harman Drive, London NW. 2, England

Division of Ser. No. 575,075, May 6, 1975, Pat. No. 3,966,527, which is a division of Ser. No. 358,953, May 10, 1973, abandoned, which is a continuation of Ser. No. 149,319, June 2, 1971, abandoned. This application Apr. 8, 1976, Ser. No. 674,988
Claims priority, application United Kingdom, June 4, 1970, 26997/70
Int. Cl.² B32B *3/00*; B29C *19/04*
U.S. Cl. 156—70 5 Claims



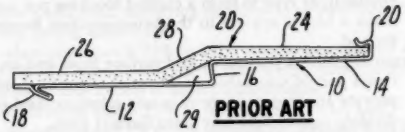
1. A method of producing a tubular article having at least one elasticized opening therein which comprises advancing a plurality of generally flattened article supporting forms stepwise in a cycle around an endless path, applying to said form in a first stage of said cycle an article blank doubled over along its bottom side with its two opposite side edges sealed together in proximity to the opposite sides of said form and its fourth edge open around said form, advancing said blank-carrying form to at least one subsequent stage in said cycle and applying an elasticized band around at least one opening in said blank, then advancing said blank-carrying form to a subsequent stage in said cycle and stripping said elasticized blank from said form by engaging the margins of said open fourth side of said blank and peeling the tubular blank axially over said form.

4,033,802

SIDING PANEL BACKERBOARD AND METHOD OF MANUFACTURING SAME

Bertram C. Culpepper, Jr., Linden, and Richard C. Wilson, Troy, both of Mich., assignors to Culpepper & Associates, Inc., Fenton, Mich.

Filed Feb. 11, 1976, Ser. No. 657,190
Int. Cl.² E04D *1/00*; B32B *31/12*
U.S. Cl. 156—71 6 Claims



1. A method for assembling a prefabricated backerboard to the exterior wall surfacing of a building, said backerboard comprising a siding panel of the type having longitudinally disposed first and second walls connected by a longitudinal step wherein the siding panel being adapted to said building exterior wall, with the said backerboard being adapted to be

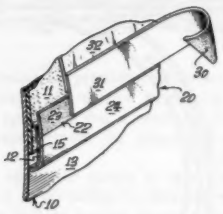
disposed between the inner surface of the siding panel walls and the exterior surface of the building, said method comprising the steps of cutting a first sheet of insulating material such that the one surface thereof and one edge thereof, respectively, have a contour that is complementary to the inner wall surfaces of the siding panel and longitudinal step within which it is adapted to be utilized; cutting a second sheet of insulating material such that the one surface thereof has a contour which is complementary to the wall surface of the panel member which said second sheet is adapted to abut and a width which is greater than said last mentioned wall surface such that the excess portion of said second sheet overlaps said first sheet; overlapping said excess portion of said second sheet with a portion of said first sheet; and bonding the overlapping surfaces of said sheets to each other, and thereafter assembling said prefabricated backerboard in position on the exterior wall of said building.

4,033,803

DOUBLE ADHESIVE MASKING TAPE

Glen L. Coder, 942 Millburg, La Puente, Calif. 90602

Filed Nov. 2, 1976, Ser. No. 738,097
Int. Cl.² B32B 7/10
U.S. Cl. 156—71 **5 Claims**



1. An improved method for masking a portion of a surface in preparation for painting the unmasked portion thereof, the method being of the type utilizing a protective sheet of paper having an adhesive strip adhered along an edge thereof, wherein the improvement comprises:

adhering a strip of masking tape having a first principal side completely coated with a pressure sensitive adhesive and having its second principal side having a longitudinal area coated with a pressure sensitive adhesive and the remainder of this second side being free of adhesive, said adhering step being carried out so that the first side of the strip covers the edge of the area to be masked and the second side of the tape is positioned toward the area to be painted; and

adhering a combined protective paper and adhesive strip assembly to said masking tape by contacting the pressure sensitive portion of the adhesive tape to the portion of the masking tape which is coated with the pressure sensitive adhesive

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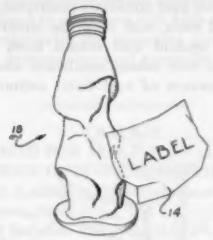
4,033,804

RECLAIMING WASTE PLASTICS

Eugene P. Baldyga, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed July 7, 1975, Ser. No. 593,545
Int. Cl.² B29C 29/00; B32B 35/00
U.S. Cl. 156—84 **11 Claims**

1. In a process for delabeling molecularly oriented thermoplastic articles having labels adhesively bonded to surface portions thereof, the step of relieving orientation stresses beneath the labels to the extent of reducing the surface area of



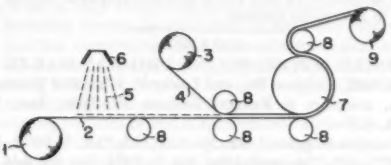
such portions by at least about five percent, thereby causing the thermoplastic material and labels to separate.

4,033,805

METHOD FOR MANUFACTURING AN INSULATED ELECTRIC COIL

Hisayasu Mitsui; Jun-ichi Kamiuchi; Ryozi Kumazawa; Kimikazu Umemoto; Toshimitsu Yamada; Katsuhiko Yoshida, and Taichi Takechi, all of Yokohama, Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Continuation of Ser. No. 443,472, Feb. 19, 1974, abandoned.
This application Feb. 24, 1976, Ser. No. 660,776
Claims priority, application Japan, May 30, 1973, 48-60705
Int. Cl.² B32B 19/04, 31/12; H01B 13/08
U.S. Cl. 156—185 **20 Claims**



1. A method of manufacturing an insulated electrical coil comprising the steps of:

a. bonding a mica sheet to a lining material to produce a compound mica sheet by

1. depositing a mixture of powdered epoxy resin and a curing agent onto the surface of a mica sheet to produce a coated mica sheet,
2. contacting the lining material with the coated mica sheet, and
3. subjecting the coated mica sheet and lining material together to a temperature and pressure sufficient to thermally fuse the powdered epoxy resin and bond the lining material to the mica sheet;

b. mechanically winding said compound mica sheet into an electrical coil;

c. impregnating the coil wound with the compound mica sheet with a thermosetting resin; and

d. curing said impregnated coil.

4,033,806

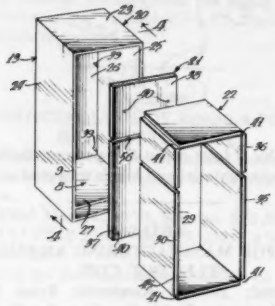
METHOD OF MAKING REFRIGERATION APPARATUS ENCLOSURE STRUCTURE

Robert E. Lindenschmidt, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Division of Ser. No. 433,070, Jan. 14, 1974, Pat. No. 3,910,658. This application Aug. 4, 1975, Ser. No. 601,635
Int. Cl.² B32B 31/18; B65D 11/20; F25D 11/00
U.S. Cl. 156—211 **10 Claims**

1. A method of constructing a refrigeration apparatus en-

closure comprising the steps of: fabricating a front opening outer cabinet having a back wall, top, bottom and side walls and defining a plurality of one-piece continuous corners; providing a flat laminate of sheet liner and insulation; cutting first wall means from said laminate; positioning said first wall means against said back wall with the sheet liner disposed interiorly; cutting second wall means from said laminate; slitting said second wall means insulation along lines corresponding to the corners of said outer cabinet; folding said



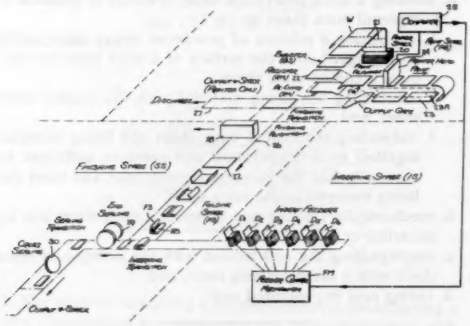
second wall means sheet liner at the slits with the sheet liner disposed interiorly to define one-piece continuous corners and outer voids; fitting the folded second wall means within said outer cabinet with the insulation confronting the inner surface of the cabinet along at least two of said top, bottom and side walls and with continuous corners of said liner being inwardly respectively aligned with said cabinet continuous corners spaced therefrom by said voids; and securing said second wall means to said outer cabinet.

4,033,807

SYSTEM FOR PRODUCING TWO-WAY MAILER

Jimmie Neill, Hatboro, Pa., and Lester V. Wise, Old Westbury, N.Y., assignors to Federal Business Products, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 620,323, Oct. 7, 1975, Pat. No. 3,977,597. This application Jan. 5, 1976, Ser. No. 646,857
Int. Cl.² B41L *47/42*
U.S. Cl. 156—384 **10 Claims**



1. In a system for printing fresh blanks on both faces thereof with a single printing head capable of imprinting blanks which lie below the head, the combination comprising:

A. a conveyor loop for transporting the blanks to be printed and having an input and an output, whereby each fresh blank admitted to the input of the loop is advanced thereby past the printing head at a position therebelow for imprinting on the obverse face of the blank, after which it is turned over and advanced toward the output thereof;

B. means periodically to feed fresh blanks to the input of the loop with an interval between each fresh blank admitted to the input and the succeeding fresh blank; and

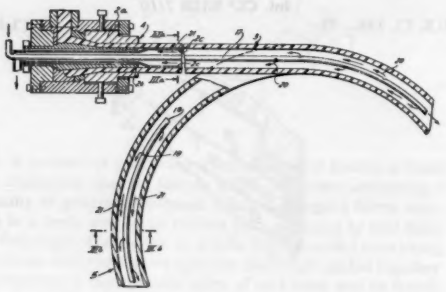
C. selective means coupled to the output of the loop to transfer each turned-over blank already printed on one face thereof back to the input of the loop in the interval between the admission thereto of fresh blanks, each of said transferred blanks being advanced past the printing head for printing on the other face thereof, said selective means functioning to discharge from the loop only those turned-over blanks printed on both faces thereof.

4,033,808

APPARATUS FOR THE PRODUCTION OF HOLLOW BODIES, ESPECIALLY LARGE-DIAMETER DUCTS FROM THERMOPLASTIC SYNTHETIC RESIN

Aristovoulos George Petzetakis, Thessaloniki and Chandri Street, Moschaton, Piraeus, Greece

Division of Ser. No. 371,559, June 19, 1973, Pat. No. 3,917,500. This application Jan. 30, 1975, Ser. No. 545,748
Claims priority, application Greece, June 21, 1972, 48609
Int. Cl.² B31C *13/00*; B29F *3/00*
U.S. Cl. 156—425 **3 Claims**



1. An apparatus for making a duct comprising:

an extruder having an extrusion die shaped to produce a continuous hollow profile thermoplastic strip in a thermoplastic state with a rectangular outer cross-section and a round inner cross-section;

a coil-forming machine downstream of said extruder and comprising a coiling drum formed by a plurality of angularly equispaced coiling rollers, and means for synchronously driving said rollers in the same sense of rotation, said strip passing on to said rollers at one end and forming a helix around said rollers advancing axially toward the other end with said helix rotating in said sense of rotation;

means for axially pressing said strip against a coil previously formed on said rollers to bond successive turns together to form the duct with the material of the axially pressed strip blending into the material of a previous turn, said coil-forming machine and said means for axially pressing said strip against a previously produced length of duct being constructed and arranged to axially advance said duct at a speed v_1 and apply said strip such that the axial pressure applied to bond each turn to the previously formed turn results in an axial rate of increase in the length of said duct of v_2, v_1 being smaller than v_2 and the difference (v_2-v_1) representing the compaction of the strip upon the application to the previously formed duct and the axial pressure applied to said strip in bonding same to the previously formed turns; and

means including a duct extending through said die for passing a cooling liquid through said strip from said extruder through at least one turn of the duct formed on said coiling rollers, said coiling rollers being formed with smooth low friction peripheries at their respective one

end and with braking sheaths of high friction at their other ends.

4,033,809

APPARATUS FOR HANDLING COVERSLIPS

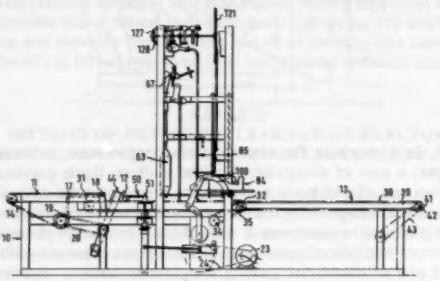
Peter William Tipton, Caversham Reading, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

Continuation-in-part of Ser. No. 493,592, Aug. 1, 1974, Pat. No. 3,972,423. This application May 12, 1976, Ser. No. 685,581

Claims priority, application United Kingdom, Aug. 16, 1973, 38702/73

Int. Cl.² B65C *9/08*; A01N *1/00*

U.S. Cl. 156—572 **3 Claims**



1. In an apparatus for preparing specimen containing slides for viewing under a microscope by placing a mounting medium over the specimen and a coverslip over the mounting medium the improvement for placement of the coverslip comprising:

A. Coverslip separator means to select a single coverslip from a stack of coverslips further comprising:

1. An open bottom hopper having a rectangular central portion adapted to contain a stack of horizontally oriented coverslips, said hopper having;
   a. First and second side pieces having their bottom edges in a plane;
   b. First and second cross pieces having their bottom edges in substantially the same plane as the bottom edges of said side pieces;
2. A base plate having
   a. An upper surface slidably engaging the bottom edges of said first and second side pieces;
   b. A depression defined in said upper surface and having a depth substantially equal to the thickness of a single coverslip;
3. Restraining means holding said hopper stationary;
4. First reciprocating means to move said base plate between a first position where said depression is under said hopper central portion and a second position where said depression is remote from said hopper central position;

B. Means to transfer said coverslip from said base plate to the mounting medium on a slide further comprising:

1. A rigid supporting frame;
2. A compressible bulb fixedly connected to said frame;
3. Flexible tubing connected to said bulb;
4. A rigid pipe connected to said tubing;
5. A suction pad connected to said pipe;
6. Second reciprocating means to raise and lower said pipe and said suction pad in a linear path from a first position in contact with said coverslip to a second position in contact with said slide;
7. First compression means supported from said frame and adapted to compress said bulb just prior to contact of said suction pad and said coverslip, and to remove compression while said suction pad and said coverslip are engaged thereby retaining said coverslip in contact with said suction pad; and

C. Means to deposit said coverslip on the mounting medium further comprising:

1. Second compression means supported from said frame and adapted to compress said bulb after said coverslip is in contact with the mounting medium on the slide, thereby desengaging said coverslip from said suction pad.

4,033,810

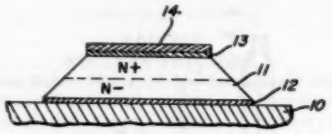
METHOD FOR MAKING AVALANCHE SEMICONDUCTOR AMPLIFIER

Chung Kyu Kim, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 490,143, July 19, 1974, abandoned, which is a division of Ser. No. 447,620, March 4, 1974, abandoned, which is a continuation of Ser. No. 291,966, Sept. 22, 1972, abandoned, which is a continuation of Ser. No. 291,483, Sept. 22, 1972, abandoned, which is a continuation of Ser. No. 133,642, April 13, 1971, abandoned. This application Apr. 29, 1976, Ser. No. 681,629

Int. Cl.² H01L *21/312*

U.S. Cl. 156—656 **7 Claims**



1. The method of forming a microwave semiconductor device comprising:

forming a body comprising a semiconductor region and a Schottky barrier junction with at least one side of said junction comprising said semiconductor region and the other side of said junction comprising a metal;

forming a metallic heat sink on said body in close thermal contact with said conjunction; and

removing portions of said semiconductor material in regions adjacent said heat sink to produce a device in which said semiconductor material is left in first and second series of elongated regions, said elongated regions of said first and second series intersecting each other in mutually orthogonal directions, all of said elongated regions being electrically coupled in parallel, each of said elongated regions extending parallel to said junction for a distance substantially greater than ten times the thickness and width of each of said elongated regions.

4,033,811

METHOD AND APPARATUS FOR FILLING OF FIBER MATERIAL AND LIQUID TO STEAM PHASE IN TREATMENT VESSEL

Stig Torleif Gloersen, Karlstad, Sweden, assignor to Stig Gloersen, Karlstad, Sweden

Filed June 9, 1975, Ser. No. 584,903

Int. Cl.² D21C *1/02*, *7/06*

U.S. Cl. 162—17 **13 Claims**

1. A method of filling a pressure treatment vessel having a steam phase and operatively connected to a pretreatment vessel with a chips-liquid mixture utilizing apparatus having a pocket of given dimensions, said method comprising the steps of sequentially and continuously

establishing a flow of chips-liquid mixture from the pretreatment vessel along a first path into the liquid-filled pocket,

depositing a chips-liquid mixture of given volume into the pocket while displacing liquid already in the pocket and removing it therefrom;

admitting gas under pressure to the pocket to expell at least a portion of the liquid therefrom while maintaining the

chips in the pocket, so that a desired volume of liquid to be admitted with chips into the pessure treatment vessel is provided in the pocket,

discharging the chips-liquid mixture in the pocket into the steam phase of the pressure treatment vessel by displacing the chips-liquid mixture from the pocket with gas,

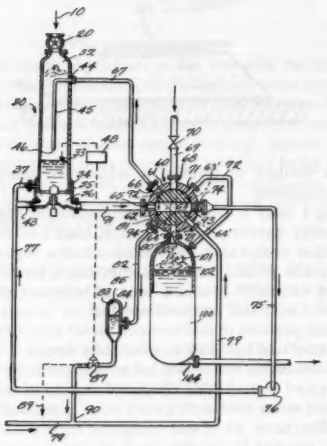
discharging the gas from the pocket into the pretreatment vessel and simultaneously filling the pocket with liquid so that the pocket is filled with liquid when another chips-liquid mixture is deposited therein, and

sequentially continuously repeating all the above steps.

9. Apparatus for filling a pressure treatment vessel having a steam phase operatively connected to a pretreatment vessel with a chips-liquid mixture, said apparatus comprising

a rotary valve member having member having four noncommunicating pockets extending therethrough each for providing communication between an inlet and an outlet,

means for depositing a chips-liquid mixture into one of said pockets while displacing liquid in the pocket from the pocket at a first position of said valve member, said means including a first inlet and a first outlet,



means for admitting gas under pressure to one of said pockets to expell at least a portion of the liquid therefrom while maintaining the chips in the pocket at a second position of said valve member, so that the desire volume of liquid to be admitted with chips into the pressure treatment vessel is provided in the pocket, said means including a second inlet and a second outlet,

means for discharging the chips-liquid mixture from one of said pockets into the steam phase of said pressure treatment vessel at a third position of said valve member by displacing the chips-liquid mixture from the pocket with gas, said means including a third inlet and a third outlet,

means for discharging the gas from one of said pockets into said pretreatment vessel and simultaneously filling the pocket with liquid at a fourth position of said valve member so that the pocket is filled with liquid when another chips-liquid mixture is deposited therein, said means including a fourth inlet and a fourth outlet, and

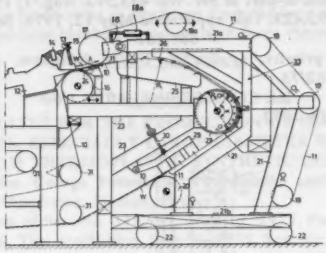
means for continuously sequentially rotating said valve member about an axis of rotation from said first to said second to said third to said fourth and back to said first position.

4,033,812

DEWATERING SYSTEMS FOR PAPER MACHINES

Kalevi Riihinen, Tampere, Finland, assignor to Valmet Oy, Finland

Filed Oct. 24, 1975, Ser. No. 625,670
Claims priority, application Finland, Oct. 25, 1974, 3138/74
Int. Cl.² D21F *1/00*
U.S. Cl. 162—273 2 Claims



1. In a machine for manufacturing paper such as tissue paper, a pair of elongated, flexible, endless, liquie-pervious means one of which is a web-carrying means and the other of which is a web-pressing means for coacting with said web-carrying means to compress a web, during formation thereof, between said pair of means, and guide means cooperating with said pair of means for guiding them for movement together along a predetermined common path of travel having a starting location at an early phase of web formation and an ending location where the web is in a condition, while compressed between and engaging both of said pair of means, to be detached from said web-pressing means while remaining in engagement with said web-carrying means and carried by said web-carring means beyond said web-pressing means with the web being compressed between said pair of means while travelling along said common path from said starting location to said ending location, said guide means cooperating with said pair of means for respectively guiding them for movement along separate paths respectively leading to said starting location and respectively travelling away from said ending location, said guide means including a breast roll cooperating with said web-carrying means and situated in advance of but adjacent to said starting location for guiding said web-carrying means toward said starting location, and said guide means cooperating with at least one of said pair of means for providing along said common path of travel through a substantial portion thereof beginning at said starting location a compressive pressure, acting on a web between said pair of means, which has progressively greater magnitudes at locations along said common path which are progressively more distant from said starting location, and headbox means situated at least in part over said breast roll and the part of said web-carrying means guided thereby for depositing on said web-carrying means at the region of said breast roll stock from which the web is formed so that the stock delivered from said headbox means is initially carried only by said web-carrying means from said breast roll toward said starting location without being compressed between said pair of means, and said guide means providing at the region of said starting location a compressive pressure greater than any dewatering pressure acting on the stock as it is carried by said web-carrying means from said breast roll to said starting location, whereby from said breast roll through said substantial portion of said common path beginning at said starting location the pressure acting to dewater the web during formation thereof increases as the extent of dewatering increases, said guide means including along said common path of travel, between and at a substantial distance from said starting and ending locations, a reversing roll for reversing the direction of trael of said pair of means, the distance of said breast roll to said starting location

of said common path of travel being substantially less than one half the distance from said starting location along said common path of travel to said reversing roll, a stationary frame means carrying that part of said guide means which guides said web-carrying means with said reversing roll being situated at one end of said stationary frame means, and movable frame means carrying that part of said guide means which guides said web-pressing means, said movable frame means having a substantially U-shaped portion for receiving said reversing roll while situating said web-pressing means against said web-carrying means at said reversing roll as well as along portions of said web-carrying means extending from said reversing roll, said movable frame means having a pair of web-pressing reversing rolls respectively situated at said starting and ending locations of said common path for reversing the travel of said web-pressing means at said starting and ending locations, said movable frame means including a carriage means for displacing said movable frame means and all of the structure carried thereby in its entirety away from said stationary frame means.

4,033,813

METHOD OF DETECTING LEAKAGE OF REACTOR CORE COMPONENTS OF LIQUID METAL COOLED FAST REACTORS

Fred E. Holt; Robert J. Cash, and Robert E. Schenter, all of Richland, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 22, 1975, Ser. No. 624,804

Int. Cl.² G21C *17/04*

U.S. Cl. 176—19 LD **2 Claims**

1. In the operation of a liquid-metal-cooled fast neutron reactor, having an inert cover gas, the method of detecting failure of a sealed, non-fueled reactor core component and of detecting the location of said failed component consisting essentially of incorporating a tag gas in said sealed non-fueled component comprising different ratios of at least two isotopes selected from the group consisting of Krypton-78, Krypton-80, Krypton-82, Xenon-126, Xenon-128 and Xenon-129 to identify the location of failure of a said component and further incorporating in said tag gas Xenon-124 to identify the failure of said component, and radiochemically analyzing said cover gas for gamma radiation-energy level of 188 Kev for the presence of Xenon-125 until said Xenon-125 is detected, and subsequently analyzing said cover gas by mass spectrographic analysis for said tag gas ratios of said at least two isotopes to identify the location of said failed, non-fueled reactor core component.

4,033,814

THERMOGENIC SWIMMING-POOL TYPE NUCLEAR REACTOR

Louis Bregeon, Savigny-sur-Orge; Gérard Dupuy, Paris; Bernard Lerouge, Saint-Germain-en-Laye, and Jean-Pierre Schwartz, Paris, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

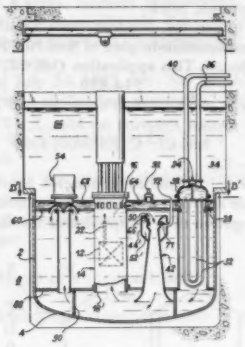
Filed Aug. 29, 1975, Ser. No. 608,990

Claims priority, application France, Aug. 30, 1974, 74.29646

Int. Cl.² G21C *15/24*

U.S. Cl. 176—63 **10 Claims**

1. A thermogenic swimming-pool type nuclear reactor, characterized in that it comprises a vertical-axis enclosure of a general cylindrical shape filled with a cooling liquid and open at the top, the said enclosure being divided into a top and a bottom zone respectively by a horizontal wall, the bottom zone containing a reactor core having a core inlet and a core outlet, at least one heat exchanger, at least one venturi each venturi being provided with a wall and an outlet and an inlet and a neck and at least one aperture formed in the wall of the venturi at the neck of the venturi, and pump means for circulating some of the cooling liquid between the core outlet and the core inlet through the exchanger and the venturi, the reactor further comprising at least one conduit extending through said horizontal wall and opening at a top end into the



top zone and, at a bottom end, into the aperture formed in the wall of the venturi.

4,033,815

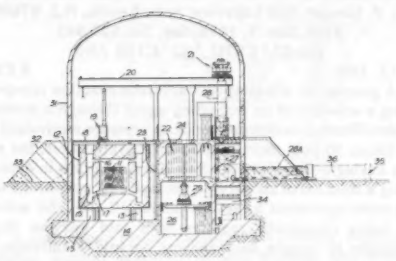
NUCLEAR REACTORS

John William Robert Webber, Ashby Parva, near Lutterworth, and Anthony Charles Roberts, Blaby, both of England, assignors to Nuclear Power Company (Whetstone) Limited, Whetstone and Taylor Woodrow Construction Limited, Southall, both of, England

Filed May 7, 1975, Ser. No. 575,360

Int. Cl.² G21C *13/00*

U.S. Cl. 176—87 **8 Claims**



1. A nuclear reactor installation comprising a fluid-cooled nuclear heat source, a primary pressure vessel containing the heat source, and an outer envelope surrounding the primary pressure vessel and providing external-missile protection therefor, wherein there are provided a floor, dividing the outer envelope internally into upper and lower sections, and an internal wall, dividing the lower section into respectively a first part containing the primary pressure vessel and a second part, the said internal wall and that part of the floor disposed over the said second part of the section below the floor being joined in pressure-tight manner to each other and to the outer envelope and constituting therewith a pressure-tight secondary containment means encompasses the said upper section and the said first part of the said lower section but excludes the said second part of the section below the floor, the said second part containing shielded facilities including a new fuel store and a spent fuel store, and there being provided in the said upper section handling means for transporting reactor components, including nuclear fuel, between the interior of the primary pressure vessel and the said shielded facilities through normally-closed access apertures in the primary pressure vessel and in the said floor.

4,033,816

PROCESS FOR INHIBITING PLATELET AGGREGATION

Neel C. Sekhar, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

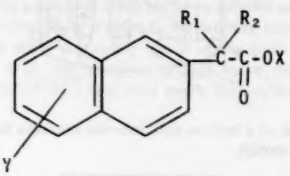
Continuation of Ser. No. 370,990, June 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 276,714, July 3, 1972, abandoned. This application Oct. 15, 1974, Ser. No. 514,839

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² C12B *3/00, 9/00*

U.S. Cl. 195—1.8 3 Claims

1. A process for inhibiting platelet aggregation in vitro comprising the addition of an effective amount for inhibiting platelet aggregation of a compound of the formula:



wherein Y is lower alkyl of 1 to 8 carbon atoms, cyclopropyl, ethinyl, $-CF_3$, $-F$, $-Cl$, $-OCH_3$, $-OCHF_2$, $-OCH_2OCH_3$, $-SCH_3$, $-SCHF_2$, $-SCH_2OCH_3$, acetyl; R_1 and R_2 are H, CH_3, CHF_2, or taken together are $=CH_2$ or $=CF_2$; and X is hydrogen, or a pharmacologically acceptable cation, to whole blood or platelet-rich concentrates.

4,033,817

PRESSURE-DRIVEN ENZYME-COUPLED MEMBRANES

Harry P. Gregor, 150 Lakeview Ave., Leonia, N.J. 07605

Filed Nov. 7, 1975, Ser. No. 629,941

Int. Cl.² C07G *7/02;* C12B *1/00*

U.S. Cl. 195—2 8 Claims

1. A process for effecting an enzymatic reaction comprising forcing a solution of an activating agent through a homoporous ultrafiltration membrane under a pressure equivalent to at least about 30 psig, thereby to form activated sites, the membrane having pores of about 15 to 200 Angstroms in diameter, forcing a solution of an enzyme through said membrane under a pressure equivalent to at least about 10 psig, the activated sites being chemically reactive with said enzyme thereby chemically to couple said enzyme to said membrane, and forcing a substrate solution through said membrane under a pressure equivalent to at least about 5 psig, said substrate solution containing a material which is capable of being converted by said enzyme, whereby said enzyme-coupled membrane effects said enzymatic conversion of said material.

4,033,818

PROCESS FOR THE PREPARATION OF A COMPLETE EXTRACT OF PILEWORT ROOTS

Henri Pourrat, and Aimée Pourrat nee Gaillard, both of Clermont Ferrand Cedex, France, assignors to Centre Europeen de Recherches Mauvernay C.E.R.M., Riom, France

Filed July 15, 1976, Ser. No. 705,460

Claims priority, application France, July 18, 1975, 75.22527

Int. Cl.³ C12D *1/00*

U.S. Cl. 195—7 5 Claims

1. A process for the extraction of the active substances from tuberised pilewort roots, said process comprising the following stages:

a. macerating the pilewort roots, which have previously been dried and ground to a powder, in 35°–45° C petroleum ether, extracting them with this solvent, so as to remove all the substances soluble therein, separating the resulting solid residue from the solvent and drying it;

b. macerating the dried residue in an aqeuous lower alcohol and extracting it with a supplementary amount of this aqueous alcohol;

c. subjecting the resulting alcoholic extract to two successive concentrations in each of which the quantity of alcohol is approximately halved, allowing the extract to cool after each concentration, and removing precipitated impurities by filtration;

d. treating the filtrate with papaine and concentrating it to a solids content of 40 to 50%;

e. adding an equal volume of an aqueous lower alcohol to the viscous solution thus obtained, allowing the mixture to stand in the cold, and removing the insoluble products by decantation, filtration or centrifugation; and

f. distilling off the alcohol so as to give an aqueous extract.

4,033,819

DERIVATIVES OF DIPHTHERIA TOXIN, PROCESS FOR PREPARING THEM AND AGENTS CONTAINING THEM

Torsten Bertil Helting, Marbach-Marburg an der Lahn, Germany, assignor to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Filed Oct. 9, 1975, Ser. No. 621,238

Claims priority, application Germany, Oct. 11, 1974, 2448530

Int. Cl.² C12D *7/00;* C12K *5/00*

U.S. Cl. 195—29 8 Claims

1. A method for preparing a derivative of fragment B of diphtheria toxin, which method comprises treating an aqueous solution of diphtheria toxin with an aliphatic mono-or di-aldehyde having 1 to 6 carbon atoms at an aldehyde concentration from 0.0015 M to 0.035 M, at 1° C to 20° C, for 5 minutes to 50 hours, reacting the toxin, before or after the aldehyde treatment, with a proteolytic enzyme in the presence of a compound splitting disulfide bridges, recovering the so-obtained derivative of fragment B from the solution by protein-chemical isolation processes in the presence of a denaturing agent, and separating said derivative from the denaturing agent.

4,033,820

STARCH SPONGE COLUMN APPARATUS AND PROCESS FOR IMMOBILIZED ENZYME REACTIONS

Robert Ernest Brouillard, Cedar Rapids, Iowa, assignor to Penick & Ford, Limited, Cedar Rapids, Iowa

Filed Aug. 23, 1976, Ser. No. 716,518

Int. Cl.² C12D *13/02;* C12B *1/00;* C07G *7/02*

U.S. Cl. 195—31 R 14 Claims

6. The process for reacting a water-soluble enzyme-convertible substance with an enzyme in which a water solution of the substance is passed through a porous bed of material containing immobilized therein at least one enzyme for the reaction, wherein the improvement comprises employing as said bed starch in sponge form which has been chemically modified to incorporate an effective amount of enzyme-immobilizing groups, said starch sponge bed having a flow direction length of at least 2 feet, and passing said water solution through said bed at a rate of over 0.5 gallon of solution per minute per square foot of bed cross-section.

4,033,821

PROCESS FOR PRODUCING YEAST CELLS

Teizi Urakami, and Reiko Michimi, both of Niigata, Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 539,603, Jan. 8, 1975, abandoned. This application Apr. 9, 1976, Ser. No. 675,551
Claims priority, application Japan, Jan. 14, 1974, 49-7387
Int. Cl.² C12C *11/08;* C12B *1/00*
U.S. Cl. 195—49 6 Claims

1. A process for producing yeast cells which comprises culturing aerobically a yeast belonging to *Pichia aganobii* in a culture liquor containing methanol and/or ethanol as a carbon source, nitrogen sources, inorganic salts and other nutrient sources, and recovering yeast cells therefrom.

4,033,822

ENZYME-COUPLED ULTRAFILTRATION MEMBRANES

Harry P. Gregor, 150 Lakeview Ave., Leonia, N.J. 07605

Filed Nov. 7, 1975, Ser. No. 629,940
Int. Cl.² C07G *7/02*
U.S. Cl. 195—68 4 Claims

1. A process for producing an enzyme-coupled ultrafiltration membrane comprising forcing a solution of cyanogen bromide under a pressure equivalent to at least about 30 psig through a homoporous cellulosic ultrafiltration membrane having pores of about 15 to 200 Angstroms in diameter thereby to form activated sites within such membrane, washing away excess cyanogen bromide and forcing a solution of chymotrypsin or beta-galactosidase through said membrane under a pressure equivalent to at least about 10 psig, the activated sites being reactive with said enzyme thereby to couple said enzyme to said membrane.

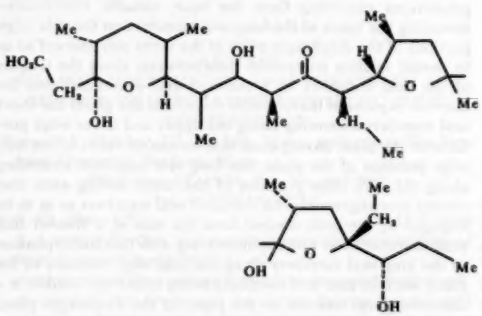
4,033,823

PROCESS TO PRODUCE LYSOCELLIN

Chao-Min Liu, Cedar Grove; Norberto Palleroni, North Caldwell; Theron Hermann, Bloomfield, and Barbara Prosser, Newark, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Aug. 12, 1976, Ser. No. 713,754
Int. Cl. C12D *9/14*
U.S. Cl. 195—80 R 1 Claim

1. A process for the production of the antibiotic lysocellin having the following formula



which comprises cultivating a strain of *Streptomyces longwoodensis* ATCC 29251 in an aqueous carbohydrate solution containing a nitrogenous nutrient under submerged aerobic conditions and thereafter isolating the lysocellin from said solution.

4,033,824

PROCESS FOR THE DETERMINATION OF PLASMINOGEN

Hermann Erich Karges; Norbert Heimburger, both of Marburg-Marbach, and Eckart Jacobi, Erkrath, all of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Filed July 24, 1975, Ser. No. 598,626
Claims priority, application Germany, July 26, 1974, 2435988
Int. Cl.² G01N *33/00, 31/14*
U.S. Cl. 195—99 7 Claims

1. A method for the analytical determination of human plasminogen, which comprises mixing a liquid containing diluted human plasminogen with

a. streptokinase,
b. fibrinogen,
c. the plasminogen of a ruminant, and
d. thrombin,

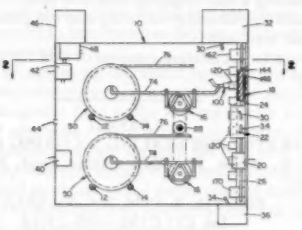
and then determining the coagulation time of the mixture.

4,033,825

CELL CULTURE SYSTEM

Ihsan A. Haddad, Bedford, and Alvin R. Arsenault, Burlington, both of Mass., assignors to Instrumentation Laboratory, Inc., Lexington, Mass.

Continuation of Ser. No. 365,535, May 31, 1973, Pat. No. 3,887,436. This application Feb. 6, 1975, Ser. No. 547,703
The portion of the term of this patent subsequent to June 3, 1992, has been disclaimed.
Int. Cl.² C12K *9/00*
U.S. Cl. 195—127 12 Claims



1. A cell culture system comprising a housing, a cell culture chamber support assembly in said housing and removable from said housing, a cell culture chamber on said support assembly, said cell culture chamber being a replaceable, sterilizable elongated tubular member of gas permeable, liquid impermeable material and having an inner surface to which cells are attachable and an outer surface exposed to the gaseous environment in said housing, said tubular member being disposed in a plurality of layers in spiral relation, spacer structure between adjacent layers of said spiral chamber maintaining said adjacent layers spaced from one another to permit gas to contact external surfaces of said spiral chamber over substantially its entire length, circulation path structure on said support assembly including supply and return conduits connected to said cell culture chamber so that an elongated spiral flow path between said supply and return conduits is provided by said chamber, pump means on said support assembly for circulating nutrient media along said circulation path and across said inner surface of said cell culture chamber, a detachable drive coupling on said support assembly for connecting said pump means to an external power source, a valve and a pH sensor in said circulation path, a carbon dioxide sensor in said housing, a first control responsive to said pH sensor for controlling the introduction of carbon dioxide to said housing, and a second control responsive to said carbon dioxide sensor for operating said valve to discard at least a portion of the

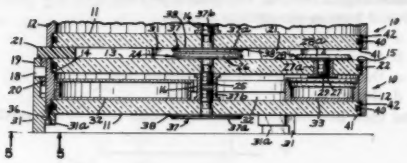
nutrient media circulating in said circulation path and replace such discarded portion with fresh nutrient media.

4,033,826

ANAEROBIC SYSTEM CONTAINER

Otis M. Larsen; Richard D. Larsen, both of 4036 Reservoir Blvd., Minneapolis, Minn. 55421; Gerald P. Tjernagel, 620 Page, N. Mankato, Minn. 56001, and Steven L. Marine, 220 Aurora Lane, Circle Pines, Minn. 55014

Filed Nov. 20, 1975, Ser. No. 633,827
Int. Cl.² C12B 1/10
U.S. Cl. 195—139 **4 Claims**



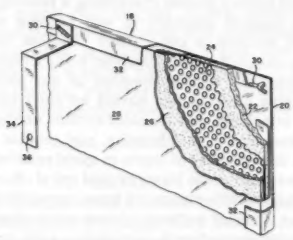
1. A culture system, comprising:
1. a generally cylindrical tray, having a transparent bottom portion and an upstanding circular wall, said upstanding circular wall being sized such that the effective interior height of said containers is slightly greater than the height of typical culture dish, said wall having a circumferential inner seal seat formed about the interior thereof at least one culture dish in a non-stacking arrangement positioned within said tray.
2. a top plate, generally transparent, fitting securely within said cylindrical tray on said inner seal seat, said top plate including a seal engaging said seal seat;
3. means for releasably securing said top plate to said cylindrical tray; and
4. means for facilitating removal of said top plate from said tray.

4,033,827

APPARATUS FOR SEALING A COKING CHAMBER

Herbert A. White, Jr., 2516 Collins Road, Pittsburgh, Pa. 15235

Filed Feb. 2, 1976, Ser. No. 654,516
Int. Cl.² C10B 1/06, 25/16
U.S. Cl. 202—248 **11 Claims**



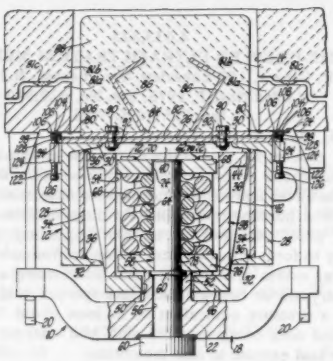
1. In a coke oven having a heating chamber, a door opening at one end of said chamber, a door jamb surrounding the door opening and having a flat sealing surface extending over its periphery, a door having a peripheral sealing edge at the end of a metal member generally normal to said sealing surface and adapted to engage said contacting sealing surface, and a detachable high temperature resistant, deformable and compressible sealing member adapted to be received between said sealing surface and said sealing edge, said sealing member including a plurality of layers one of which being a high temperature resistant compressible insulating material; the improvement wherein said sealing member includes an outer layer of steel foil adjacent one side of said layer of high temperature resistant compressible insulating material, and perforated steel strip means adjacent the other side of said layer of insulating material for spreading and equalizing the compressive load transmitted through the sealing edge to the sealing member.

4,033,828

COKE OVEN DOOR SEAL

William K. Morrow, 3722 Forge, and Walter B. Peterman, Jr., 2673 Renshaw, both of Troy, Mich. 48084

Filed July 6, 1976, Ser. No. 702,553
Int. Cl.² C10B 25/06
U.S. Cl. 202—248 **12 Claims**



1. In an elongated rectangular coke oven door for closing a vertically extending door opening of a coke oven, a seal comprising: a metallic diaphragm plate of a vertically elongated rectangular shape secured to the door and including an inner side that faces toward the oven in a closed position of the door as well as an outer side that faces toward the environment in the door closed position; said diaphragm plate including relatively short upper and lower edge portions as well as relatively long side edge portions; each of said edge portions extending outwardly beyond the periphery of the door opening in the door closed position; elongated metallic seal members associated with the edge portions of the diaphragm plate and having long and short lengths corresponding to the lengths of the associated edge portions; each seal member having a channel shape including a base engaged with the associated edge portion of the diaphragm plate and a pair of spaced projections extending from the base; slidable connections mounting the bases of the long seal members on the side edge portions of the diaphragm plate at the inner side thereof so as to permit relative movement therebetween along the lengths of the seal members in a manner that accommodates for thermal expansion thereof with respect to the plate; the short seal members extending along the upper and lower edge portions of the plate having ends that terminate short of the side edge portions of the plate; the long seal members extending along the side edge portions of the plate having ends that extend into alignment with the short seal members so as to be engaged by the ends thereof from the side in a manner that seals therebetween without interfering with thermal expansion of the long seal members along the side edge portions of the plate; each of said seal members being relatively flexible in a direction perpendicular to the plane of the diaphragm plate; the projections of the seal members engaging the oven about the periphery of the door opening in the door closed position to provide sealing thereof; and means for adjusting the position of the diaphragm plate edge portions inward and outward with respect to the oven along the lengths thereof so as to flex the seal members to ensure engagement of the seal members

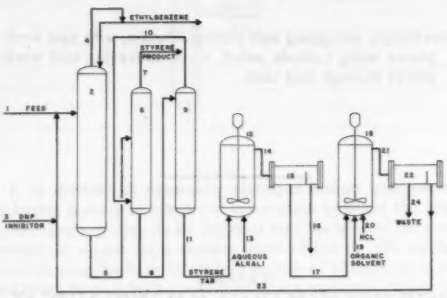
with the oven in the door closed position and consequent sealing of the door opening.

4,033,829

PROCESS FOR INHIBITING POLYMERIZATION OF STYRENE DURING DISTILLATION

Thomas D. Higgins, Jr., Texas City, and Raymond A. Newsom, Dickinson, both of Tex., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 536,271, Dec. 26, 1974, Pat. No. 3,959,395. This application Dec. 15, 1975, Ser. No. 640,360
Int. Cl.² B01D *3/32*; C07C *15/10*
U.S. Cl. 203—9 **1 Claim**



1. The method for inhibiting the polymerization of styrene during separation and recovery thereof from a mixture consisting substantially of ethylbenzene, styrene and styrene tar in a plurality of distillation stages to recover ethylbenzene, styrene and styrene tar, respectively, which comprises introducing into the first of said distillation stages in an amount sufficient to inhibit polymerization of styrene, a solution of a dinitrophenol, said dinitrophenol having no substituents on the benzene ring other than the hydroxy group and the nitro groups, obtained by intimately contacting styrene tar containing such a dinitrophenol inhibitor with an aqueous solution of the hydroxide of an alkali metal or ammonia at a temperature between about 70° and about 95° C while controlling the pH of the aqueous phase between about **5** and **10**, separating the resulting liquid phases, intimately contacting the separated aqueous phase simultaneously with hydrochloric acid and an organic solvent selected from the group consisting of ethylbenzene and ethylbenzene in admixture with sytrene, benzene and toluene while controlling the pH of the aqueous phase below 3 and recovering the organic phase containing substantially all the dinitrophenol dissolved therein from said acid-solvent contacting.

4,033,830

ON-LINE AMPEROMETRIC ANALYSIS SYSTEM AND METHOD INCORPORATING AUTOMATIC FLOW COMPENSATION

Kenneth S. Fletcher, III, Norfolk, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Filed Mar. 17, 1976, Ser. No. 667,969
Int. Cl.² G01N *27/54*
U.S. Cl. 204—1 T **10 Claims**

1. A system for flow compensated amperometric analysis of a flowing stream comprising:

conduit means for enabling flow of the stream therethrough;

electrode means to contact the stream flowing through said conduit means; said electrode means comprising means capable of serving as magnetic flow meter electrodes and as test and counter electrodes of an amperometric analysis system;

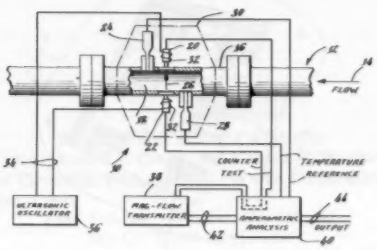
a reference electrode positioned to contact the stream for printing a potentiostat with said electrode means serving as counter and test electrodes for amperometric measurement of the stream;

means coupled to said electrodes to produce an amperometric measurement signal representing the current flow through said test electrode required to produce a predetermined potential difference between said reference and test electrodes;

means coupled to said electrode means to develop magnetic flow metering signal representing the flow rate of said stream; and

means for combining said magnetic flow metering signal with said amperometric measurement signal to obtain an amperometric analysis of the stream that is flow compensated.

6. A method for directly analyzing the concentration of unknown chemical species of a flowing stream by amperometric measurement comprising the steps of:



flowing the stream through an amperometric cell containing electrode means comprising a test and a counter electrode and a reference electrode, said reference electrode having a potential relative to the test electrode;

causing a current to flow between the test electrode and the counter electrode;

developing an output signal related to said current to provide an amperometric measurement of the stream;

applying a magnetic field to the flowing stream to develop from said electrode means a potential output signal related to stream flow rate through the cell; and

combining the flow rate output signal and the amperometric output signal to obtain a final amperometric output signal relating to concentration of unknown chemical species in the stream that is flow compensated.

4,033,831

METHOD OF MAKING A BI-METAL SCREEN FOR THICK FILM FABRICATION

Joseph J. Bakewell, Boxford, Mass., assignor to Dynamics Research Corporation, Wilmington, Mass.

Continuation of Ser. No. 321,461, Jan. 5, 1973, abandoned. This application Sept. 23, 1974, Ser. No. 508,554
Int. Cl.² C25D *1/08*, *7/00*
U.S. Cl. 204—11 **3 Claims**

1. A method for fabricating a bi-metallic screen for printing precisely dimensional thick film elements of printed electronic circuits comprising the steps of:

applying a thick film element edge defining layer of a first metal to a spacing sheet formed of a second metal having a different etching characteristic from that of the edge defining layer;

said edge defining layer having a thickness substantially less than the thickness of the spacing sheet;

removing portions of said edge defining layer in a plurality of defined areas by etching of said edge defining layer substantially without undercutting thereof to expose areas of said spacing sheet through said edge defining layer;

etching first cavities into said spacing sheet through the

areas exposed by the removed portions of said edge defining layer;

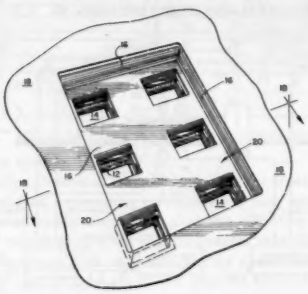
the first cavities being etched to a depth which is a predetermined portion of the thickness of the spacing sheet;

producing a row and column matrix of unconnected insulator regions over the surface of said spacing sheet opposite to the surface having said edge defining layer;

the dimensions of said insulator regions being substantially smaller than the dimensions of the removed areas of said edge defining layer;

electrodepositing a metal on the portions of the opposite side of the spacing sheet surrounding said insulator regions to provide a support mesh;

the metal of said support mesh having a different etching characteristic from that of said spacing sheet;



the electrodepositing step providing a support mesh extending outwardly from said spacing sheet and contacting said spacing sheet substantially only at areas around said insulator regions;

said first cavities being etched with respect to the matrix of said insulator regions to provide at least one edge of said cavities parallel to at least one of the rows and columns of said matrix;

removing the insulator regions; and

etching a matrix of second cavities into the spacing sheet through the openings of the support mesh exposed by the removal of the insulator regions, the etching of said second cavities being to a depth to communicate with said first cavities.

4,033,832

METHOD FOR SELECTIVE PLATING

Henley F. Sterling, Great Dunmow, and Miles P. Drake, Harlow, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed June 14, 1976, Ser. No. 695,736

Claims priority, application United Kingdom, June 16, 1975, 25584/75

Int. Cl.² C25D *5/02, 5/08, 17/28*

U.S. Cl. 204—15 **4 Claims**

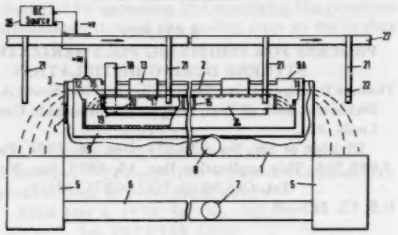
1. A process for selectively electro-plating a plurality of workpieces comprising the steps of:

providing a tank having slots in the opposite end walls thereof opening to the tops of said walls;

floating in said tank an electrolytic plating solution layer over a denser, underlying, inert fluid which is immiscible with said plating solution;

maintaining the interface of said plating solution and said underlying fluid in said tank at a predetermined level above the bottoms of said slots;

conveying said workpieces through said tank via said slots at such a level that said workpieces are immersed in said plating solution, and extend through said interface to a predetermined depth into said underlying fluid, said inert solution operating to mask that portion of the workpieces extending therein to produce a plating stripe on said workpieces having a dimension equal to the depth of said plating solution layer; and



electrically energizing said plating solution, with said workpieces being cathode poled, while conveying said workpieces through said tank.

4,033,833

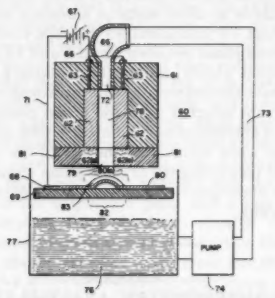
METHOD OF SELECTIVELY ELECTROPLATING AN AREA OF A SURFACE

John Louis Bestel, Montgomery Township, Somerset County; Richard Haynes, East Windsor Township, Mercer County, both of N.J., and Venkataraman Srinivasan, Attleboro, Mass., assignors to Western Electric Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 627,317, Oct. 30, 1975, abandoned. This application July 8, 1976, Ser. No. 703,326

Int. Cl.² C25D *5/02, 5/08*

U.S. Cl. 204—15 **8 Claims**



1. A method of selectively electroplating an area of a surface, which comprises:

a. cathodically charging the surface and initially maintaining said charged surface out of contact with an electroplating electrolyte;

b. contact masking a charged anode, spaced from said maintained charged surface, with a dielectric member which is maintained between said anode and the surface, along their corresponding opposed surface areas, out of contact with the surface;

c. contacting said masked anode with a stream of electroplating electrolyte; and

d. distributing said electrolyte stream over at least a portion of the surface, said portion including the area to be electroplated, to freely flow a stream of electrolyte thereover, to selectively electroplate the area.

4,033,834

METHOD FOR PLATING

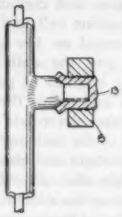
Norman Harrison, Sabden, England, assignor to Lucas Electrical Company Limited, Birmingham, England

Division of Ser. No. 621,141, Oct. 9, 1975. This application July 28, 1976, Ser. No. 709,520

Claims priority, application United Kingdom, Oct. 16, 1975, 44790/75

Int. Cl.² C25D 5/02, 7/04

U.S. Cl. 204—15 1 Claim



1. A method of externally plating a hollow component, including making an electrical connection between the component and a plating jig by inserting into the bore of the component, as a push fit, a contact piece of the jig, the contact piece closing the bore to prevent ingress of electrolyte in use and being formed from a non-conducting resiliently compressible matrix containing conductive particles such that a conductive path is established through the matrix wherever this is compressed, the contact piece being arranged to be compressed by contact with the interior of the component and so establish an electrical connection between the conductive frame of the jig and the component.

4,033,835

TIN-NICKEL PLATING BATH

Lewis Brian Lerner, Linglestown, and Thomas Francis Davis, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 14, 1975, Ser. No. 621,997

Int. Cl.² C25D 3/56, 3/60

U.S. Cl. 204—43 S 9 Claims

8. An aqueous electrolyte suitable for electrodeposition of tin-nickel alloys from said electrolyte, said aqueous electrolyte comprising nickel as nickel chloride, based on the metal, in an amount from 7.5 to 30 grams per liter, tin as tin chloride ($SnCl_2 \cdot H_2O$) based on the metal from 7.5 to 30 grams per liter, thiourea from 10 to 100 grams per liter, sodium hypophosphite from 10 to 100 grams per liter, hydrochloric acid from 30 to 100 milliliters per liter as a concentrated acid of 36 percent to 38 percent acid and ammonium chloride an in amount from 40 to 200 grams per liter and wherein the pH of said solution is from 0.7 up to 1.5.

4,033,836

ELECTROLYTIC REDUCTION CELL

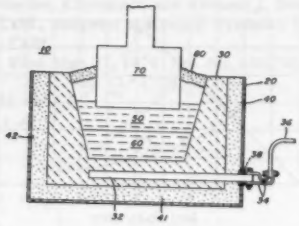
G. Thomas Holmes, Badin, N.C., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 21, 1976, Ser. No. 734,612

Int. Cl.² C25C 3/06, 3/08

U.S. Cl. 204—67 5 Claims

1. An improved reduction cell comprising a metal shell, a layer of carbonaceous material for containing electrolyte, the carbonaceous material permeable by sodium, an insulative layer of aluminum fluoride disposed intermediate the metal shell and the layer of carbonaceous material, said aluminum fluoride being reactive with sodium permeating said carbonaceous layer thereby preventing substantial corrosive attack by the sodium of the shell.



4,033,837

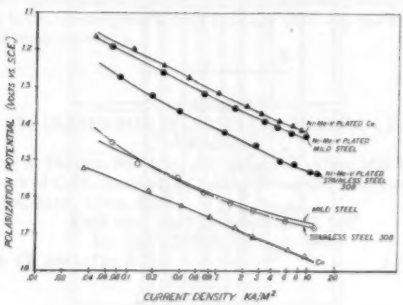
PLATED METALLIC CATHODE

Han C. Kuo; Ronald L. Dotson, and Kenneth E. Woodard, Jr., all of Cleveland, Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed Feb. 24, 1976, Ser. No. 660,847

Int. Cl.² C25B 1/34, 11/04

U.S. Cl. 204—98 6 Claims



1. A cathode for use in electrolytic cells comprising a copper substrate and a plating on said copper substrate, said plating being an alloy of nickel, vanadium, and molybdenum.

6. The cathode of claim 1 used in electrolytic cells for the electrolysis of alkali metal chloride solutions.

4,033,838

RECOVERY OF COPPER FROM WASTE NITRATE LIQUORS BY ELECTROLYSIS

Isadore Mockrin, Plymouth Meeting, and Martin A. Hobin, Allentown, both of Pa., assignors to Kawecki Berylco Industries, Inc., Reading, Pa.

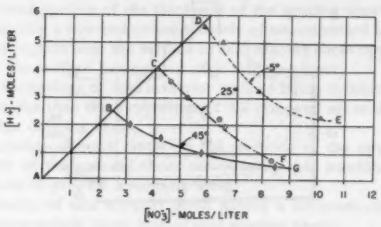
Filed May 19, 1976, Ser. No. 687,885

Int. Cl.² C25B 1/22; C25C 1/12

U.S. Cl. 204—103 11 Claims

1. A process for recovering copper and regenerating nitric acid from waste liquors containing nitrate ion or nitrate ion plus unused nitric acid, said process comprising adjusting the nitrate and hydronium ion concentrations in the liquor to

between about 2 to 12 moles per liter and between about 0.5 to 6 moles per liter, respectively, and subjecting the liquor to



electrolysis at a temperature of between about 0° to 55° C. using anodes resistant to oxidation.

4,033,839

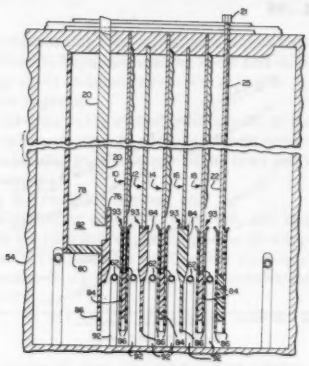
METHOD FOR SERIES ELECTROWINNING AND ELECTROREFINING OF METALS

Walter W. Harvey, Bedford; Myron R. Randlett, Burlington, and Kartis I. Bangerskis, Walpole, all of Mass., assignors to Kennecott Copper Corporation, New York, N.Y.

Division of Ser. No. 553,139, Feb. 26, 1975, Pat. No. 3,979,275, which is a continuation-in-part of Ser. No. 445,435, Feb. 25, 1974, Pat. No. 3,875,041. This application Apr. 14, 1976, Ser. No. 676,685

Int. Cl.² C25C *1/12*

U.S. Cl. 204—108 **9 Claims**



1. A process of performing series electrodeposition of metals at a high current density while reducing bypass current comprising:

a. providing a conveyable rack formed of a non-conductive material and including a pair of sidewalls having slots on the bottom extending through the sidewalls to allow fluid flow through the sidewalls, the conveyable rack also being provided with non-conductive bottom support members extending between and secured to each sidewall between the slots, the conveyable rack also being provided with nonconductive electrode guides on the side of the rack in line with the bottom support members, the length of the nonconductive electrode guides being sufficient to extend the entire submerged length of a bipolar electrode is placed in the rack with the rack in a tank containing an electrolyte, said rack also being provided with a means for shielding an anode to prevent current from passing along the side, bottom and back of the anode toward the cathode when an anode and cathode are in the rack during electrodeposition;

b. positioning within the conveyable rack, at a location remote from an electrolytic tank,

1. an anode so that it is within the means for shielding the anode so that current cannot pass along the sides, bottom or back of the anode toward the cathode during electrodeposition,

2. a cathode, and

3. a series of bipolar electrode between the anode and the cathode so that the bottom of each bipolar electrode is supported by a nonconductive bottom support member and each side of each bipolar electrode is within a nonconductive electrode guide;

c. conveying the conveyable rack which has been loaded in step (b) with an anode, a cathode and bipolar electrodes to an electrodeposition tank containing an electrolyte to form an electrodeposition cell; and,

d. electrodepositing metal on the cathodic faces of the bipolar electrodes and the cathode while generating sheets of ascending bubbles of gas from bubble tubes positioned between and below the bipolar electrode to continuously circulate electrolyte over the top of the rack, down the side of the rack and through the slots, the bottom support members and electrode guides forming compartments within the cell which minimize lateral spreading and contraction of the sheet of bubbles and reduce the possibility of bypass current.

4,033,840

THERMOSETTING ACRYLOYLOXY-TERMINATE BUTADIENE POLYMERS

Yoshio Fujiwara; Keiichi Naito; Yoshinobu Fujimoto, all of Utsunomiya; Tooru Odashima, Kanuma, and Tomohiko Sada, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 389,213, Aug. 17, 1973, abandoned. This application Feb. 6, 1975, Ser. No. 547,701

Claims priority, application Japan, Aug. 21, 1972, 47-82789

Int. Cl.² C08F *8/00*; C08L *9/00, 31/02*

U.S. Cl. 204—159.17 **6 Claims**

1. A thermosetting resin composition consisting essentially of

a. a butadiene-containing resin having an average molecular weight of 1000 to 5000 and being selected from the group consisting of acryloyloxyl- and methacryloyloxyl-terminated butadiene homopolymers and copolymers of butadiene with acrylonitrile or styrene which contain at least 70 weight percent of butadiene, said butadiene-containing resin having from 1.5 to 3.0 terminating acryloyloxyl or methacryloyloxyl groups per molecule of said butadiene-containing resin;

b. at least one ethylenically unsaturated monomer which is capable of copolymerizing with said terminating groups of said butadiene-containing resin and which is present in an amount between 50 and 200 weight percent based on said butadiene-containing resin; and

c. at least one unreacted ethylenically unsaturated acid anhydride selected from the group consisting of maleic anhydride, itaconic anhydride, dodecenyl succinic anhydride, methyl-endo-methylene-tetrahydrophthalic anhydride, tetrahydrophthalic tetrahydrophthalic anhydride and methyltetrahydrophthalic anhydride, and being present in an amount between 5 and 20 weight percent based on said butadiene-containing resin.

4,033,841

LIQUID REMOVING METHOD AND APPARATUS

James T. Candor, 5440 Cynthia Lane, Dayton, Ohio 45429

Continuation-in-part of Ser. No. 569,815, April 21, 1975, Pat. No. 3,966,575. This application June 11, 1976, Ser. No. 695,068

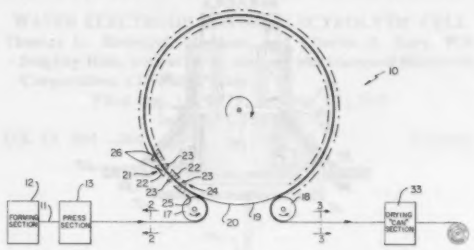
The portion of the term of this patent subsequent to Nov. 19, 1991, has been disclaimed.

Int. Cl.² B01D *13/02*

U.S. Cl. 204—180 R **7 Claims**

1. In a method of removing retained liquid from web-like bearing material of the liquid absorbing type as said material is being substantially continuously moved, the improvement

comprising the steps of creating a plurality of non-uniform electrostatic fields with each field having the higher intensity portion thereof substantially oppositely located relative to the higher intensity portion of an adjacent non-uniform field, and

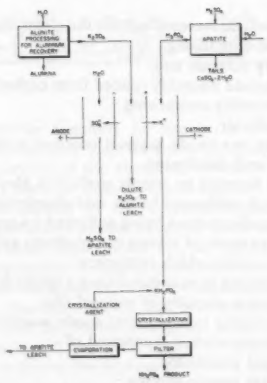


passing said continuously moving web-like material through said fields so that said fields at least partially extend through said material to act on at least part of the retained liquid thereof to move at least part of said retained liquid relative to said material.

4,033,842
PRODUCTION OF MONOBASIC POTASSIUM PHOSPHATE BY ELECTRODIALYSIS

Kent W. Loest, Broomfield, and John T. Schaefer, Boulder, both of Colo., assignors to Southwire Company, Carrollton, Ga.; National Steel Corporation, Pittsburgh, Pa. and Earth Sciences, Inc., Golden, Colo.

Continuation-in-part of Ser. No. 608,628, Aug. 28, 1975, abandoned. This application Apr. 26, 1976, Ser. No. 680,333
Int. Cl.² B01D *13/02;* **C01B** *15/16, 25/26*
U.S. Cl. 204—180 P **34 Claims**

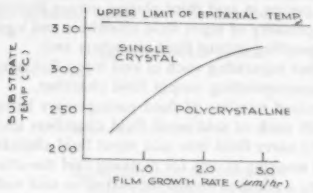


1. In the combined process for producing phosphoric acid by treating apatite with sulfuric acid, and aluminum from alunite ore with the production of by-product potassium sulfate, the improvement which comprises converting the phosphoric acid and potassium sulfate to monobasic potassium phosphate by electrodialysis.

4,033,843
SIMPLE METHOD OF PREPARING STRUCTURALLY HIGH QUALITY PBSNTE FILMS

Esther Krikorian, Claremont, and Richard J. Sneed, Upland, both of Calif., assignors to General Dynamics Corporation, Pomona, Calif.

Filed May 27, 1976, Ser. No. 690,705
Int. Cl.² C23C *15/00*
U.S. Cl. 204—192 P **13 Claims**



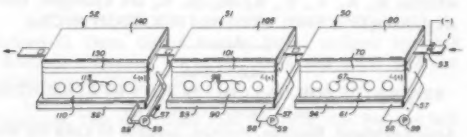
1. A method of predictably preparing high structural quality, single-crystal $Pb_{1-x}Sn_xTe$ films having infrared sensing properties, said method comprising:

sputtering from a single $Pb_{1-x}Sn_xTe$ target a single crystal $Pb_{1-x}Sn_xTe$ film on a selected single crystal substrate in a selected inert gas atmosphere in a reaction zone at pressures below 10μm after first having evacuated said reaction zone to at least about 10^{-7} torr, said sputtering employing control of substrate temperature and film growth rate where substrate temperature is selected from a range from about 220° to about 350° C and the film growth rate is selected from a range from about 0.1 to about 3.0μm/hr., with the higher of said growth rates typically used with the higher of said temperatures and the lower of said growth rates typically used with the lower of said temperatures.

4,033,844
APPARATUS FOR SELECTIVELY PLATING LEAD FRAMES

Gene N. Pantiga, San Jose, and Robert M. Allen, Mill Valley, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Nov. 3, 1975, Ser. No. 628,541
Int. Cl.² C25D *5/02, 5/10, 7/06*
U.S. Cl. 204—224 R **2 Claims**



1. An apparatus for selectively plating a lead frame strip, said strip including a plurality of lead frames, each of said frames including a plurality of leads, each of said leads having a tip, and a die-attach pad, comprising:

means for providing a first plating on each of said lead frames, said first plating being a plating directly on and restricted to the surface of a predetermined portion of said tip of each of said leads and said die-attach pad, said first plating means comprising masking means for masking the surface of each of said lead frames about said tip of each of said leads;

means for providing a second plating on each of said lead frames, said second plating being a plating directly on said first plating and which is restricted to the area of said die-attach pad, said second plating means comprising a masking means for masking the surface of each of said lead frames about said die-attach pad; and

means for providing a third plating on each of said lead

frames, said third plating being a plating directly on said first plating which is restricted to the area of said tip portion of each of said leads said third plating means comprising a first means for masking the surface of said lead frames about said tip of each of said leads and a second means for masking said die-attach pad,

each of said plating means further comprising means for jetting a plating fluid against each of said lead frames and means for providing an electric field in said fluid between said fluid and said lead frames,

said jetting means in said third plating means further comprising a plurality of input fluid chambers and a plurality of corresponding output fluid chambers and;

a wall member separating each of said input fluid chambers from its corresponding output fluid chamber,

a predetermined number of fluid passageways being associated with each of said input fluid chambers and being adapted to carry fluid into said input fluid chamber;

said second masking means for masking said die-attach pad comprising a pedestal means supported on said wall member and a fluid sealing member supported on said pedestal means for sealing against said die-attach pad.

4,033,845

[2-(4-OXO-4H-1-BENZOPYRAN-2-YL)ETHENYL]BENZONITRILES AND BENZOIC ACIDS

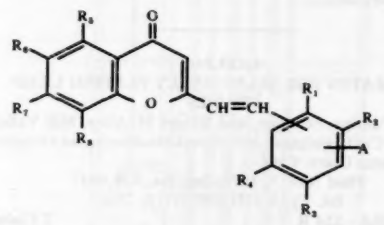
Marvin P. Cohen, New Milford; John Shavel, Jr., Mendham, and Max von Strandtmann, Rockaway Township, Morris County, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Nov. 20, 1975, Ser. No. 633,761

Int. Cl.² C07D *311/22*

U.S. Cl. 260—240 D **11 Claims**

1. A compound of the formula:



I

wherein R_1, R_2, R_3, R_4, R_5, R_6, R_7, R_8 are hydrogen, lower alkyl, halogen or lower alkoxy and A is COOH or CN.

4,033,846

APPARATUS FOR GAS COLLECTION IN ALUMINUM SMELTING FURNACES

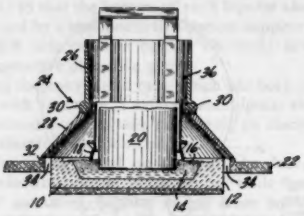
Arne Engesland, Mosjoen, Norway, assignor to Lista Og Mosjoen Aluminiumverk, Elkem Aluminum A/S & Co., Oslo, Norway

Filed Sept. 16, 1975, Ser. No. 613,900

Int. Cl.² C25C *3/08, 3/22*

U.S. Cl. 204—247 **4 Claims**

1. In an electric smelting furnace for the melt electrolytic production of aluminum including a furnace post having an annular outer side wall and generally cylindrical anode section disposed above the furnace pot and being of lesser diameter than the diameter of the furnace pot the improvement comprising an annular gas collecting hood, said gas collecting hood comprising upper and lower portions each of which comprises a plurality of sections and each plurality of sections in combination forming an annular shape and each said section of each plurality of sections being movable with respect to any other section independently of the other to permit access to said furnace pot, each of said sections in the lower portion having a slope upwardly towards the anode section and the lower end of the lower portion being of greater diameter than the diameter of the outer wall of the furnace pot and being spaced radially outward from the outer wall of the furnace pot to permit entry of air, the upper portion being disposed at least



in part radially outward from the anode section and being spaced along its length from the anode section to permit upward egress of gases evolved from the smelting process.

4,033,847

METAL ANODE ASSEMBLY

Joseph E. Baker, Clearwater, Fla., assignor to Olin Corporation, New Haven, Conn.

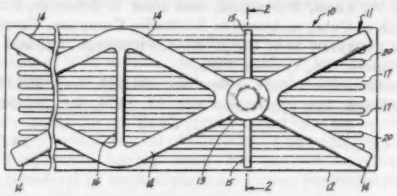
Division of Ser. No. 412,936, Nov. 5, 1973, Pat. No. 3,953,316.

This application Dec. 23, 1975, Ser. No. 643,725

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.² C25B *11/02, 11/04*

U.S. Cl. 204—250 **6 Claims**



1. An electrolytic mercury cell for the electrolysis of flowing brine, said cell comprising

a. a mercury cathode and

b. a metal anode assembly spaced from cathode, said metal anode assembly comprising

1. a distributor,

2. at least one anode support receiver positioned in the top of said distributor,

3. means forming an anodic surface in electrical contact with and positioned below said distributor, and

4. said anodic surface being activated by applying a coating of an oxide of at least one platinum group metal, the improvement which comprises

i. employing as said distributor a spider-like distributor having a plurality of support ribs

ii. employing as said metal anode assembly an integral titanium casting comprised of

a. said distributor

b. said anodic surface

c. said anode support receiver

iii. said anodic surface having a first set of two opposite sides longer than the remaining set of two opposite sides,

iv. said anodic surface being formed of a series of spaced-apart bars parallel to said first set of opposite sides, and

v. said metal anode assembly being positioned in said

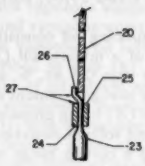
mercury cell with said spaced-apart bars extending parallel to the direction of flow of said brine.

4,033,848

WAFER ELECTRODE FOR AN ELECTROLYTIC CELL

Thomas G. Strempel, Madison, and Charles J. Hora, Willoughby Hills, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Oct. 15, 1975, Ser. No. 622,702
Int. Cl.² C25B 11/00
U.S. Cl. 204—284 4 Claims



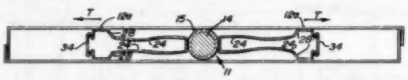
1. A wafer electrode comprising: two annular flanges having an inner circumferential edge and connected by a sealing engagement at an outer peripheral edge thereof; sandwiched between said annular flanges, a foraminous electrode plate retained between said annular flanges by weldment at the outer peripheral edge of said annular flanges; at least one access tube extending substantially in the same plane as said electrode plate from said outer peripheral edge to said inner circumferential edge through said annular flanges so as to define a passageway therebetween; and means for connecting an electrical supply source to said electrode plate.

4,033,849

ELECTRODE AND APPARATUS FOR FORMING THE SAME

Gerald R. Pohto, Mentor, and Richard O. Olson, Parma, both of Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed May 9, 1975, Ser. No. 576,014
Int. Cl.² C25B 11/02
U.S. Cl. 204—286 4 Claims



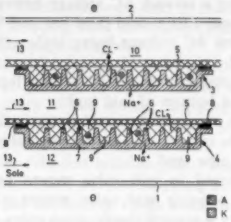
1. An electrode assembly for use in an electrolytic cell comprising: an electrode riser for conducting electrical energy to the ctive portions of the electrode assembly and to act as active support member therefore; two opposed paraliel electrode surfaces defined by two continuous generally planar electrically conductive expanded metal sheet members such that said electrode riser resides therebetween; at least two electrically conductive V-shaped connectors for mechanically connecting said electrode surfaces at distant points thereon to diametrically opposite sides of said electrode riser at points 90° removed from the points of tangetial contact of said electrode surfaces to said electrode riser if compressed together; said connectors having two leaf portions at an angle of approximately 6° relative to a plane parallel to that of said electrode surfaces and bisecting said electrode riser when said electrode surfaces are in their nonstressed condition; and at the outer ends of each of said leaf portions, a short leg extending at nearly a right angle toward said electrode surfaces, so that upon compression, said leaf portions cause an outward tension upon said electrode surfaces to maintain their planar configuration and said short legs cause a binding moment within said leaf portions in a slightly S-shaped configuration to produce said outward tension and take up the excess length of said leaf portions.

4,033,850

ELECTRODIALYSIS DEVICE

Ora Kedem, and Abraham Kedem, both of Rehovot, Israel, assignors to Yeda Research & Development Co. Ltd., Rehovot, Israel

Filed Nov. 17, 1975, Ser. No. 632,801
Claims priority, application Switzerland, Nov. 29, 1974, 15888/74
Int. Cl.² B01D 13/02
U.S. Cl. 204—301 12 Claims



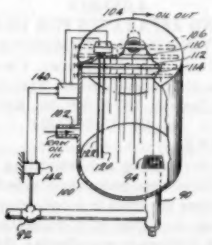
1. An electrodialysis device comprising a plurality of adjacent compartments through which there flow dialysate and brine, respectively, each dialysate compartment being separated from the adjoining two compartments by an anion-selective and by a cation-selective membrane, respectively, the two terminal compartments being provided with an anode and a cathode, connected to a current source, wherein in the dialysate space between the membranes there are provided two continuous ion-conductive elements in contact with each other, said elements consisting of two different ion exchange materials, the anion-exchange material being in contact with the anion selective membrane, the cation-exchange material being in contact with the cation selective membrane, the electric resistance of said elements being lower than that of the dialysate, said elements providing a continuous path for the different ions across more than half of the distance between the membranes.

4,033,851

A.C. HYDROELECTROSTATIC PRECIPITATOR

Richard G. Oros, Grand Rapids, Mich., assignor to C&O Railroad Company, Cleveland, Ohio and B&O Railroad Company, Baltimore, Md.

Continuation of Ser. No. 450,215, March 11, 1974, abandoned. This application June 25, 1976, Ser. No. 699,969
Int. Cl.² C10G 33/02
U.S. Cl. 204—302 7 Claims



1. Apparatus for separating oil from water in a raw mixture comprising:

a separator tank having an oil outlet disposed near the top thereof, a water outlet disposed near the bottom thereof and a raw mixture inlet disposed between said water outlet and oil outlet,

a plurality of electrodes disposed in said tank between said raw mixture inlet and said oil outlet for applying an electrical potential to separate said oil from said water, comprising first and second bars extending across said tank near the top thereof, a plurality of first wires suspended therefrom, third and fourth bars extending across said tank near the top thereof and separated from said first and second bars, a plurality of second wires having a length greater than said first wires suspended therefrom,

means for applying a first AC voltage between the first wires suspended from said first bar and from said second bar and applying a second AC voltage between said second wires suspended from said third bar and from said fourth bar, said first AC voltage being higher than said second AC voltage,

means for sensing the conductivity of the liquid at a location adjacent the bottom of said tank,

an outlet pipe connected to said water outlet,

valve means in said outlet pipe for controlling flow through said outlet pipe, and

means connected to said valve means and said sensing means for opening said valve means when the sensed conductivity is greater than a given value and closing said valve means when the sensed conductivity is less than said value.

4,033,852
PROCESS FOR TREATING COAL AND PRODUCTS PRODUCED THEREBY

Carl Horowitz, and Michael Dichter, both of Brooklyn, N.Y., assignors to Polygulf Associates, New York, N.Y.

Filed June 26, 1975, Ser. No. 590,696
Int. Cl.² C10G *1/04*
U.S. Cl. 208—8 **12 Claims**

8. A process for grafting polymeric side chains onto natural coal which comprises dispersing natural coal, 0.5 to 10 wt.% based on said coal of an olefinically unsaturated monomer and a catalyst system selected from the group consisting of a free radical catalyst system comprising a source of silver ions and a peroxide polymerization initiator and an ionic catalyst system comprising a sodium naphthalene charge transfer complex in a fluid medium, heating the aforesaid material at a temperature of 25° to 150° C. to produce coal radicals and to react said coal radicals with said monomer to produce a grafted coal product.

9. The process of claim **8**, wherein said fluid medium is a solvent for said grafted coal product and the grafted coal product is extracted from the reacted mixture of ingredients upon completion of the heating step to produce a liquified coal product.

4,033,853
PROCESS AND APPARATUS FOR HEATING AND DEAERATING RAW BITUMINOUS FROTH

Thomas C. A. Hann, Fort McMurray, Canada, assignor to Great Canadian Oil Sands Limited, Toronto, Canada

Filed Jan. 16, 1976, Ser. No. 649,608
Int. Cl.² C10G *1/04*
U.S. Cl. 208—11 LE **3 Claims**

1. In a method for heating and deaerating bituminous froth containing up to 70 volume percent occluded air, said method comprising collecting the froth in a collection zone and subsequently deaerating the froth in a deaeration zone, the improvement which comprises transferring the froth from the collection zone to the deaeration zone through a conduit wherein the froth is contacted with stream directionally provided to cause the froth to flow from the collection zone to the deaeration zone, said steam concurrently heating the froth to cause formation of gas pockets therein, thereby effecting improved deaeration in said deaeration zone.

4,033,854
ELECTRICAL INSULATING OILS

Tadashi Ohmori, Yokohama, and Tokuo Fujisou, Kawasaki, both of Japan, assignors to Nippon Oil Company, Ltd., Tokyo, Japan

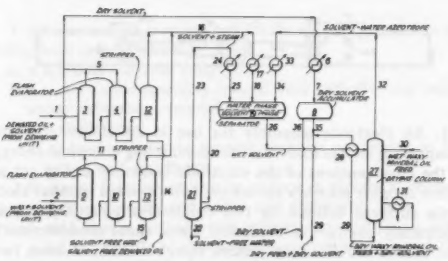
Filed Dec. 1, 1975, Ser. No. 636,391
Claims priority, application Japan, Dec. 2, 1974, 49-136983; Sept. 26, 1975, 50-115682
Int. Cl.² C10G *39/00*; H01B *3/22*
U.S. Cl. 208—14 **21 Claims**

1. An electrical insulating oil consisting essentially of (I) 100 parts by weight of a mineral oil (A) having a sulphur content of not higher than 0.5 wt. %, a pour point of from −10° to −25° C. and a nitrogen content of not more than 100 p.p.m., the mineral oil (A) being prepared by subjecting at at least to hydrofining and solvent dewaxing a fraction containing a distillate having a boiling range of 280° – 400° C. at atmospheric pressure, the fraction being obtained by the distillation of a paraffin base crude oil or a mixed base crude oil and (II) 5 – 100 parts by weight of a highly aromatic hydrocarbon oil (B) prepared by hydrofining a fraction having a boiling range of 250° – 400° C. at atmospheric pressure, the fraction being produced as a by-product of subjecting naphtha hydrocarbons to reforming reaction at temperatures of 400° – 600° C. in the presence of a catalyst selected from the group consisting of the Platinum Group metals and combinations of each of the Platinum Group metals with at least one of Ge, Sn, Re, Fe, Ni, Pb and halogens.

4,033,855
MINERAL OIL DEWAXING PROCESS WITH DEHYDRATION OF FEED AND SOLVENT

Joachim E. Plitz, Offenthal, Germany, assignor to Edeleanu Gesellschaft mbH, Frankfurt, Germany

Filed Nov. 24, 1975, Ser. No. 634,960
Claims priority, application Germany, Nov. 26, 1974, 2455785
Int. Cl.² C10G *43/04*, *43/08*
U.S. Cl. 208—25 **10 Claims**



1. In a mineral oil dewaxing process wherein an oil solvent is admixed with a waxy mineral oil feed, and a dewaxed mineral oil filtrate is separated from the wax producing a wax product containing a portion of said oil solvent and a dewaxed mineral oil filtrate containing a second portion of said oil solvent, said oil solvent forming an azeotrope with water, the improvement for dehydrating wet waxy mineral oil feed and wet oil solvent which comprises:

a flash vaporizing the wax product containing the first portion of said oil solvent thereby producing a first oil solvent flash vapor and a flashed wax bottoms containing some oil solvent,

b. steam stripping the remaining oil solvent from the flashed bottoms thereby producing a first vaporous water-oil

solvent mixture and oil solvent-free wax as a product stream,

c. flash vaporizing the dewaxing mineral oil filtrate containing the second portion of said oil solvent thereby producing a second oil solvent flash vapor and a flashed dewaxed mineral oil filtrate bottoms containing some oil solvent,

d. steam stripping the remaining oil solvent from the flashed dewaxed mineral oil filtrate bottoms thereby producing a second vaporous water-oil solvent mixture and a solvent-free mineral oil filtrate as a product stream,

e. condensing the first oil solvent flash vapor of step (a) and the second oil solvent flash vapor of step (c) thereby producing a condensed oil solvent,

f. condensing the first vaporous water-oil solvent mixture of step (b), the second vaporous water-oil solvent mixture of step (d), and the vaporous oil solvent-water azeotrope, hereinafter described in step (h), thereby producing a condensed mixture of oil solvent and water,

g. separating said condensed mixture of oil solvent and water from step (f) into an aqueous phase of oil solvent and water an an organic phase of wet oil solvent,

h. distilling the wet oil solvent of step (g) and the wet waxy mineral oil feed to produce an oil solvent-water azeotrope as an overhead product and a mixture of a water free-mineral oil feed and water free-oil solvent as a bottoms product, and

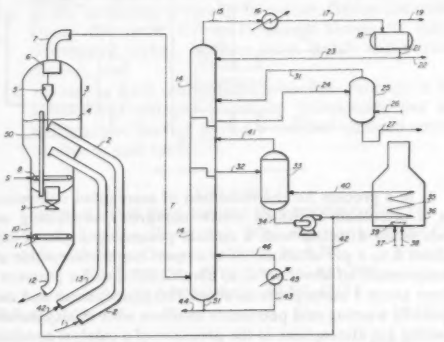
i. passing said bottoms product together with condensed oil solvent from step (e) to the mineral oil dewaxing process as the feed stream thereto.

4,033,856

FLUIDIZED CATALYTIC CRACKING PROCESS WITH IMPROVED INTERMEDIATE CYCLE GAS OIL STRIPPING

James H. Colvert; Frederick C. Jahnke, and Dale Williams, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,870
Int. Cl.² C10G 7/00, 37/00
U.S. Cl. 208—102 **5 Claims**



1. In a fluidized catalytic cracking process wherein a fresh feed hydrocarbon is contacted with regenerated catalyst in a cracking zone under cracking conditions, wherein cracked hydrocarbons vapors are separated from spent catalyst in a reaction vessel forming a hydrocarbon vapor phase and a dense phase fluidized catalyst bed, wherein the spent catalyst from said fluidized bed is returned to a regeneration zone for regeneration and subsequent contact with additional hydrocarbon charge, wherein cracked hydrocarbon vapors removed overhead from said reaction vessel are charged to a product fractionation column for separation into fractions including a wet gas fraction, a naphtha fraction, a light cycle gas oil fraction, an intermediate cycle gas oil fraction, and a heavy cycle gas oil fraction, wherein said light cycle gas oil fraction is stripped in a first stripping zone for separation of naphtha boiling range components therefrom and for production of a light cycle product boiling in the range of about 400°–650° F. wherein said intermediate cycle fraction is stripped in a second stripping zone for separation of light cycle gas oil boiling range hydrocarbons and for production of a stripped intermediate gas oil stream boiling in the range of about 575°–750° F., wherein a portion of said stripped intermediate cycle gas oil stream is contacted with regenerated catalyst in a fluidized catalytic cracking zone under cracking conditions and wherein cracked intermediate cycle gas oil vapors are separated from spent catalyst in said reaction vessel, such that said cracked intermediate cycle gas oil vapors enters the hydrocarbon vapor phase and the spent catalyst enters the dense phase fluidized catalyst bed; the improvement which comprises:

a. charging said intermediate cycle gas oil fraction, containing light cycle gas oil boiling range hydrocarbons from said product fractionation column to the upper portion of said second stripping zone for contact with reboiled intermediate cycle gas oil vapors,

b. reboiling, in a second direct fired reboiling zone, a first stripped intermediate cycle gas oil stream withdrawn from the bottom of said second stripping zone, at a temperature of about 700° to 800° F. and a pressure of about atmospheric to 45 psig;

c. charging said reboiled intermediate cycle gas oil to the lower portion of said second stripping zone for stripping light cycle gas oil boiling range components from said intermediate cycle gas oil fraction; and

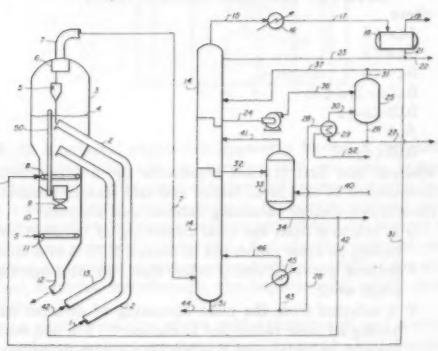
d. recycling a portion of stripped intermediate cycle gas oil from the bottom of said second stripping zone to said fluidized catalytic cracking zone at a temperature of from about 600° F. to about 750° F.

4,033,857

FLUIDIZED CATALYTIC CRACKING PROCESS WITH IMPROVED LIGHT CYCLE GAS OIL STRIPPING

Dale Williams; James H. Colvert, and Frederick C. Jahnke, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,050
Int. Cl.² C10G 7/00, 37/00
U.S. Cl. 208—102 **3 Claims**



1. In a fluidized catalytic cracking process wherein a fresh feed hydrocarbon is contacted with regenerated catlayst in a cracking zone under cracking conditions, wherein cracked hydrocarbon vapors and spent catalyst from the cracking zone are separated in a reaction vessel to form a dense phase fluidized catalyst bed and a hydrocarbon vapor dilute phase, wherein hydrocarbon vapors from said recation vessel are fractionated, in a product fractionation column into a plurality of fractions including a light cycle gas oil fraction boiling in the range of from about 400° F to about 650° F, wherein said light cycle gas oil fraction is contacted with stripping vapors in a light cycle gas oil stripping vessel forming a vapor phase comprising heavy naphtha components and liquid stripped

light cycle gas oil; the improvement which comprises:

a. recovering, from the bottom of said product fractionation column, a non-distillate heavy cycle gas oil fraction, at a temperature of about 600°–700° F;

b. charging said light cycle gas oil fraction from said product fractionation column to said light gas oil stripping vessel at a temperature in the range of about 400°–550° F;

c. reboiling, in a light cycle gas-oil reboiler, a first portion of said stripped light cycle gas oil, in an amount equivalent to about 1/10 to about 8/10 the weight of light cycle gas oil fraction charged to said stripping vessel, by indirect heat exchange with said non-distillate heavy cycle gas oil fraction for producing stripping vapors;

d. charging said reboiled light cycle gas oil to the lower portion of said light cycle gas oil stripping vessel for stripping heavy naphtha components from said light cycle gas oil fraction and

e. recovering from said light cycle gas oil stripping vessel a heavy naphtha vapor stream and stripped light cycle gas oil stream.

4,033,858

CRACKING HYDROCARBONS OVER LAMINAR HEAVY METAL ALUMINOSILICATES

William T. Granquist, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Division of Ser. No. 508,339, Sept. 23, 1974, Pat. No. 3,976,744, which is a continuation-in-part of Ser. No. 291,252, Sept. 22, 1972, Pat. No. 3,852,405. This application June 17, 1976, Ser. No. 697,231

Int. Cl.² C10G *11/08*; B01J *27/12*

U.S. Cl. 208—115 **5 Claims**

1. The process of cracking hydrocarbons which comprises contacting a hydrocarbon feedstock at a temperature high enough to bring about cracking with a catalyst consisting essentially of a synthetic laminar 2:1 layer-lattice aluminosilicate mineral possessing an inherent negative charge balanced bu cations exterior to said lattice and corresponding to the followig formula for a given embodiment:

$$[(G^{3}_{4-w}Y^{2}_{3w})^{V}(Q^{4}_{4}—XR^{3}_{2})^{IV}O_{20}(OH)_{4-f}F_{f}]\cdot[dC^{y}]$$

where

$2<e<3$

$0<w<2$

$0<w<4$

$0<(e-2)w<⅓$

$0.05<x<2$

$f<4$

$0.05<dy<2$

wherein said first bracket represents the average unit cell formulation of said layer lattice and said second bracket represents said charge balancing cations; and wherein

G is selected from the class consisting of trivaient cations having an ionic radius not to exceed 0.75 A and mixtures thereof, provided that G is less than 100 mole percent Al when $w=0$;

Y is selected from the class consisting of divalent cations having an ionic radius not to exceed 0.75 A and mixtures thereof; provided that Y is less than 100 mole percent Mg when $w=2$;

Q is at least 95 mole percent silicon ions, the remainder consisting of tetravalent cations having an ionic radius not to exceed 0.64 A;

R is selected from the group consisting of trivalent cations having an ionic radius not to exceed 0.64 A and mixtures thereof; and

C is at least one charge balancing cations, with y being its valence and d being the number of such cations C where:

$$dy = x + 3(e-2)w$$

and thereafter recovering the products resulting from said cracking.

4,033,859

THERMAL TREATMENT OF USED PETROLEUM OILS

Donald Douglas Davidson, Pasadena, and Bjorn I. Engesvik, Bakersfield, both of Calif., assignors to Witco Chemical Corporation, New York, N.Y.

Filed Apr. 24, 1975, Ser. No. 571,114

Int. Cl.² C10M *11/00*

U.S. Cl. 208—179 **5 Claims**

1. An improved process in the recycling of used automotive crankcase oil comprising heating said oil in an essentially liquid state at a temperature of between about 400°–800° F under a pressure of about 500–3500 p.s.i.g. and thereafter separating the formed sludge from the substantially ashless oil product.

4,033,860

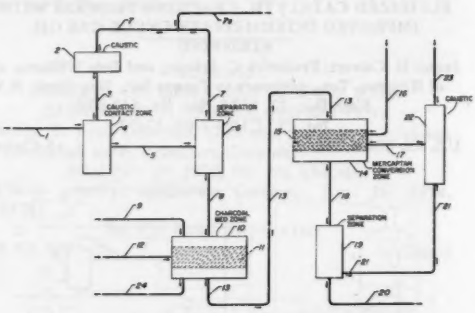
MERCAPTAN CONVERSION PROCESS

David H. J. Carlson, Park Ridge, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Sept. 10, 1975, Ser. No. 612,618

Int. Cl.² C10G *19/00*

U.S. Cl. 208—206 **17 Claims**



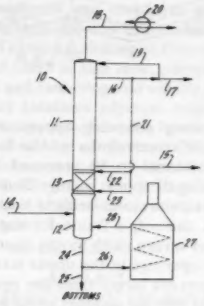
1. In a process for the reduction of mercaptan compounds in a petroleum distillate which comprises contacting said petroleum distillate with a caustic possessing a pH of from about 8 to a pH of about 10 to extract naphthenic acids at a temperature of about 10° C to about 100° C and a pressure of from about 1 atmosphere to about 100 atmospheres and catalytically treating said petroleum distillate with an oxygen-containing gas atmosphere in the presence of a catalyst consisting essentially of a metal phthalocyanine compound dispersed on a solid catalytic support in a caustic medium possessing a pH of from about 9 to a pH of about 14 at a temperature of from about 10° C to about 100° C, a pressure of from about 1 atmosphere to about 100 atmospheres and a liquid hourly space velocity of from about 0.5 to about 10 to substantially reduce mercaptan content of said petroleum distillate the improvement which consists of passing said petroleum distillate subsequent to contacting with said caustic and before catalytic treatment thereof through an unimpregnated charcoal bed selected from the group consisting of a charcoal derived from lignite coal, bituminous coal, vegetable sources, peat, petroleum black extrusions and bone char to remove catalyst-toxin precursors from said distillate at a temperature of from about 10° C to about 100° C, a pressure of from about 1 atmosphere to about 10 atmospheres and a liquid hourly space velocity of from about 0.5 to about 10.

4,033,861

REDUCED NITROGEN CONTENT OF HYDROCARBON FRACTION BY CATALYTIC POLYMERIZATION

Richard L. Holloway, Country Club Hills; Robert R. Edison, Olympia Fields, and Stephen J. Wachtel, Homewood, all of Ill., assignors to Atlantic Richfield Company, Philadelphia, Pa.

Filed May 19, 1975, Ser. No. 578,790
Int. Cl.[2] C10G 23/02, 29/04
U.S. Cl. 208—211 18 Claims



1. A method for producing a hydrocarbon fraction having a reduced nitrogen content from a nitrogen-containing hydrocarbon feedstock boiling primarily in the range from about 200° F. to about 1000° F. and containing at least about 1000 ppm. of nitrogen comprising:

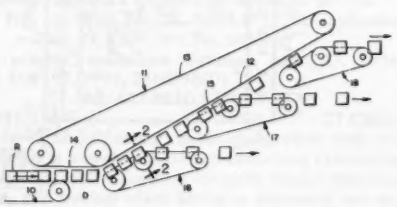
1. contacting said feedstock in the presence of a catalyst effective to promote the polymerization of the nitrogen-containing compounds in said feedstock at conditions sufficient to polymerize at least a portion of said nitrogen-containing compounds and form a reaction effluent, said catalyst comprises at least one metal selected from the group consisting of Group IB metals, Group IIB metals, Group III metals, Group IV metals Group VI metals, Group VIII metals, the rare earth metals and mixtures thereof; and
2. separating from said effluent a fraction enriched in said polymerized nitrogen-containing compounds and said hydrocarbon fraction having a reduced nitrogen content relative to said feedstock.

4,033,862

APPARATUS FOR HANDLING WOUND ROLLS

Harvey J. Spencer, Green Bay, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.

Filed Jan. 21, 1976, Ser. No. 651,200
Int. Cl.[2] B07C 9/00; B65G 47/52
U.S. Cl. 209—73 10 Claims



1. Apparatus for handling wound rolls comprising

a source conveyor adapted to deliver a series of individual wound rolls along a first path,

an endless takeaway conveyor arranged with a portion of its lower run traveling along a path at an upwardly inclined angle to said first conveyor path and equipped with spaced apart depending grippers adapted to grip each roll delivered by said source conveyor, and

a plurality of endless diverter conveyors located at spaced distances along said inclined path, with each diverter conveyor having its upper run disposed parallel to said first conveyor path,

each diverter conveyor being equipped with spaced apart upstanding grippers, and

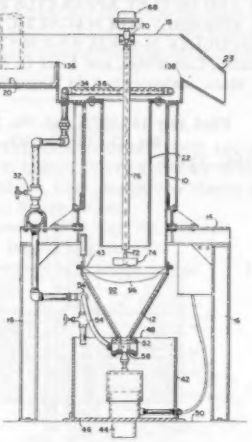
means associated with each diverter conveyor and said takeaway conveyor for selectively operating the grippers thereof whereby a selected roll from said takeaway conveyor can be selectively diverted into any of said diverter conveyors and each succeeding roll selectively diverted into any of said diverter conveyors.

4,033,863

APPARATUS FOR SEPARATING HIGH GRAVITY FROM LOW GRAVITY FRACTIONS OF A COAL OR AN ORE

Spencer A. Stone, Fort Wayne, Ind., assignor to Deister Concentrator Company Inc., Fort Wayne, Ind.

Filed Dec. 19, 1975, Ser. No. 642,453
Int. Cl.[2] B03B 5/66
U.S. Cl. 209—159 10 Claims



1. In a mineral separation apparatus having a hydraulic classifier provided with an exterior wall, an open bottom sorting column within said exterior wall, means for introducing a swirl of hydraulic medium in the sorting column, said exterior wall providing a quiescent zone below the bottom of said sorting column for collecting a bed of refuse material, and a spigot connected to said quiescent zone for discharging said refuse material therethrough, the improvement which comprises

a. a launder section above said exterior wall and sorting column and in communication therewith, said launder section having spaced, upstanding sides, and means for introducing supplemental hydraulic medium,

b. first and second weir means in said launder section on opposite sides, respectively, of said exterior wall, said first weir means being higher than said second weir means to provide a hydraulic flow gradient therebetween, feed box means in said launder section separated from said exterior wall by said first weir means whereby hydraulic medium introduced into said feed box means overflows and said first weir means into said sorting column and toward said second weir means,

c. a discharge spout on said launder section in communication with said second weir means and the top of said sorting column on the side opposite said first weir means

to receive overflow of hydraulic medium from said sorting column and said second weir means,

d. the sides of said launder section being of a height to confine flow of the hydraulic medium to and across said sorting column, said weir means and out of said spout,

e. valve means operatively associated with said spigot for maintaining the bed level in said quiescent zone,

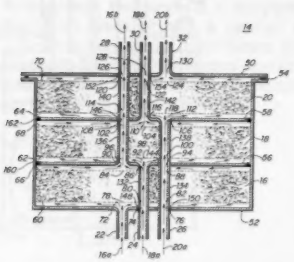
whereby the feed pulp entering said feed box means, overflowing said first and second weir means and also entering said sorting column undergoes conjoint stream and hydraulic classification before being discharged from said discharge spout.

4,033,864

INLET AND OUTLET APPARATUS FOR MULTIPLE MATRIX ASSEMBLY FOR MAGNETIC SEPARATOR AND MODULAR MATRIX AND MATRIX UNIT

John J. Nolan, Cambridge, and Peter G. Marston, Gloucester, both of Mass., assignors to Sala Magnetics, Inc., Cambridge, Mass.

Filed July 16, 1975, Ser. No. 596,167
Int. Cl.² B03C *1/02*
U.S. Cl. 209—223 R **8 Claims**



1. A multiple matrix assembly for a magnetic separator comprising:

a plurality, M, of magnetic matrices arranged in a longitudinal stacked array, each matrix being fed by a number, *p*, of inlets and having its product collected by a number *p* of outlets;

at least one partition means including a transverse member between each adjacent pair of said matrices;

a container for receiving said matrices and said partition means;

each said partition means and the longitudinal ends of said container including a number of ports P equal to $p \times M$, arranged in M sectors with *p* ports per sector, the pattern of ports being the same in each sector;

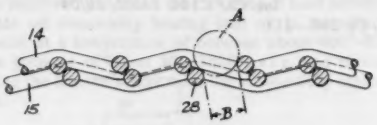
each said matrix having on each longitudinal end, *p* sections of approximately equal area and P port positions corresponding to said P ports in said partition means, each of *p* of said P port positions being located at approximately the center of each of said p sections, respectively, and being defined as through-put positions and the remaining $P - p$ port positions being through-holes penetrating said matrix; each of said *p* through-put positions in any particular sector having associated with it M−1 through holes at a corresponding location one in each of the other M−1 sectors.

4,033,865

NON-CLOGGING SCREEN APPARATUS

H. William Derrick, Jr., Williamsville, N.Y., assignor to Derrick Manufacturing Corporation, Buffalo, N.Y.

Continuation of Ser. No. 531,175, Dec. 9, 1974, abandoned. This application Feb. 23, 1976, Ser. No. 660,490
Int. Cl.² B07B *1/28*
U.S. Cl. 209—275 **4 Claims**



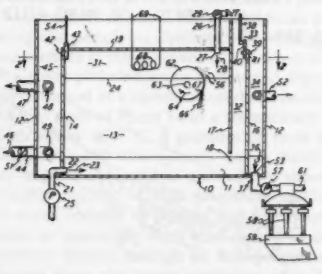
1. In a vibratory screening apparatus for finely divided material, a pair of screen cloths in close face to face abutment for receiving material to be screened thereon, the upper screen cloth being of approximately 20 mesh or finer and the openings in the screen cloths being at least twice as wide as the wire diameters thereof, a frame for supporting said screen cloths, the lower screen cloth having openings therein at least as large as the openings in the upper screen cloth but not in excess of 50 percent larger than the openings in the upper screen cloth and with the majority of the openings in the upper screen cloth intersected by the wires of the lower abutting screen cloth, said frame including a transverse series of spaced parallel longitudinally extending stringers whose upper edges define a transverse arch for supporting said screen cloths in upwardly arched formation, whereby the longitudinal wires of one screen are held securely against the transverse wires of the other screen and vice versa to lock the wires of one screen into the wires of the other in such manner that the plane defining the upper surfaces of the lower screen is above the plane defining the lower surfaces of the upper screen whereby the strands of said lower screen effectively prevents a generally spheroidal particle from becoming lodged in an opening of said upper screen, said convex surfaces further serving to effectively prevent relative vertical movement of said screen cloths during vibration thereof.

4,033,866

METHOD FOR SEPARATING FOREIGN SOLID PARTICLES FROM A LIQUID

Sigmund Johann Enzmann, 4534 Leslie Ann Lane, Racine, Wis. 53403

Division of Ser. No. 603,634, Aug. 11, 1975. This application Oct. 1, 1976, Ser. No. 728,548
Int. Cl.² B01D *37/04*, *12/00*
U.S. Cl. 210—42 S **6 Claims**



1. A method for separating foreign solid particles from a contaminated liquid, comprising the steps of pumping into an enclosed tank having a cover a vehicle liquid of a specific gravity greater than that of the contaminated liquid having the particles, pumping into said tank and on top of the vehicle

liquid the contaminated liquid and thereby floating the contaminated liquid on the vehicle liquid to present a layer of the contaminated liquid and allow the foreign solid particles to sink into the vehicle liquid, filling said tank up to said cover with both said liquids to create a pressure in said liquids in said tank, removing the originally contaminated liquid from said tank and controlling the rate of removal by use of a valve while continuously pumping additional contaminated liquid with solid particles into said tank and thereby control the height of the layer of the contaminated liquid in said tank, all of said contaminated liquid is introduced and removed relative to said tank at spaced-apart locations adjacent respective opposite sides of said tank and said layer and adjacent the upper surface of said layer, for flow of the contaminated liquid across said tank and optimum sinking of the particles from the contaminated liquid while in said tank, pumping said vehicle liquid into said tank and removing said vehicle liquid from said tank at spaced-apart locations adjacent respective opposite sides of said tank and opposite from the locations of the introduction and removal of the contaminated liquid relative to said tank, to establish a cross-flow between the two liquids, and consequently flushing the vehicle liquid and the solid particles from said tank while continuously pumping the vehicle liquid into said tank.

4,033,867

CHROMATE REDUCTION IN AQUEOUS MEDIUM

Donald F. Jacques, Cornwells Heights, and K. Robert Lange, Huntingdon Valley, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation of Ser. No. 489,962, July 19, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,629

Int. Cl.² C02C *5/02*

U.S. Cl. 210—28 **6 Claims**

4. A method for removing chromium from an aqueous medium, said chromium largely being present in said medium in the chromate form as CrO_4^{-2}, which comprises sequentially: (*a*) reducing the chromium from the chromate form to the chromic form as Cr^{+3} by controlling the pH of the medium at near zero to about 2.8, and then contacting said medium at said pH with hydrogen in the presence of a hydrogenation catalytic material on a charcoal substrate, said material being selected from the group consisting of platinum and palladium; (*b*) adjusting the pH of the medium containing the reduced chromic form to about 3.5 to about 4.0; and (*c*) contacting the medium at said pH with a cationic exchange resin in the calcium form so as to remove most of the reduced chromic form from the medium onto the resin.

4,033,868

METHOD AND APPARATUS FOR PROCESSING CONTAMINATED WASH WATER

Othmar Meichsner, Raunheim, and Horst Queiser, Hochstadt, both of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

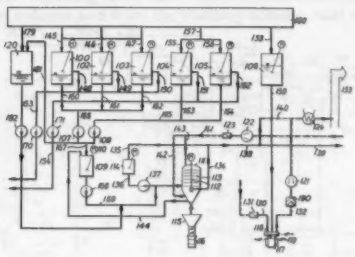
Continuation-in-part of Ser. No. 353,114, April 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 119,339, Feb. 26, 1971, Pat. No. 3,773,177. This application Oct. 29, 1974, Ser. No. 519,020

Claims priority, application Germany, Mar. 27, 1974, 2414728; Mar. 27, 1974, 7410691[U]

Int. Cl.² B01D *37/02*

U.S. Cl. 210—38 C **27 Claims**

1. A method for processing contaminated waste wash waters developed in a nuclear plant and containing radioactive solid substances and radioactive ionically bound dissolved substances, said nuclear plant having a resin-bead ion exchange filter, an evaporator concentrator, a powdered resin ion exchange filter which forms used ion exchange powder resin which can no longer be used in a straight-through operation and which is not completely exhausted as yet, and a wash-water column for the contaminated waste wash waters, said nuclear plant forming radioactive concentrate from which liquid is removed, the concentrate comprising (a) radioactive concentrate from the resin-bead ion exchange filter, (b) radioactive concentrate from the evaporation concentrator and (c) radioactive concentrate having particles of a size smaller than that of resin beads in the resin-bead ion exchange filter and having a salt content less than that of (b), and wherein a mixture of concentrate (a) and concentrate (c) is



dewatered by filtering in a filter-cake-producing filter and dried, the improvement comprising mixing the contaminated wash waters with said used ion exchange powder resin in a mixing vessel to form a suspension and remove ionically bound radioactive substances dissolved in the wash water and then feeding the resulting suspension into the filter-cake-producing filter to remove radioactive solid substances from the suspension.

4,033,869

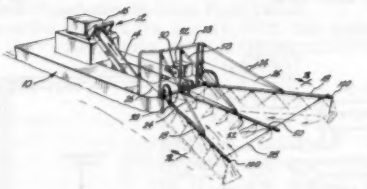
OIL SPILL CONFINING AND DIRECTING APPARATUS AND METHOD USING WATER SPRAY BOOMS

Jay L. McGrew, Littleton, Colo., assignor to Marine Construction & Design Co., Seattle, Wash.

Filed June 5, 1974, Ser. No. 476,420

Int. Cl.² B01D *37/00*

U.S. Cl. 210—65 **15 Claims**



1. The method of sweeping or confining an oil spill on open water in relation to a selected surface area, comprising forming a curtain of water spray directed downwardly from a selected height above, and at an incline toward, said surface area so as to impact the water's surface along an edge of said area, the volumetric flow rate per unit of surface area impacted by the spray, together with the spray velocity, being sufficient when combined with air entrained by the spray, to move the oil ahead of the spray into the said area, the spray discharge comprising discrete droplets of such limited size and discharge velocity as to avoid substantially breaking up and dispersing the oil by such impact.

4,033,870

DUAL OIL FILTER AUTOMATIC SWITCHING SYSTEM

Donald James Parquet, and Carl Oluf Pedersen, both of Burlington, Iowa, assignors to J. I. Case Company, Racine, Wis.

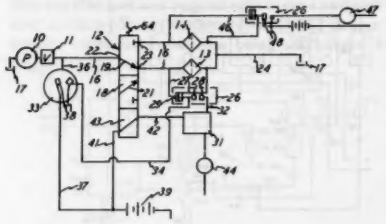
Filed July 1, 1976, Ser. No. 701,903

Int. Cl.² B01D *29/36*

U.S. Cl. 210—90 **8 Claims**

1. A dual oil filter automatic switching system comprising

two oil filters, an oil valve having an oil inlet and two oil outlets and having an electrically operative movable valve closure with a plurality of oil passageways for selective fluid-flow communication of said inlet with said two outlets, fluid lines separately interconnected between said two filters and each of said two outlets for diverting the flow of oil to said filters, an oil pump in fluid-flow communication with said oil valve for supplying oil under pressure to said inlet, a differential fluid pressure electric switch, additional fluid lines separately connected to said switch and the respective oil flow inlet and outlet sides of one of said filters for transmitting oil pressure to said switch for actuation of said switch in accordance with oil pressure at said one filter, and electric connections between said switch and said electrically operative closure for moving said closure and its said passageways relative to said two outlets to thereby direct the flow of oil relative to said two filters.



4,033,871

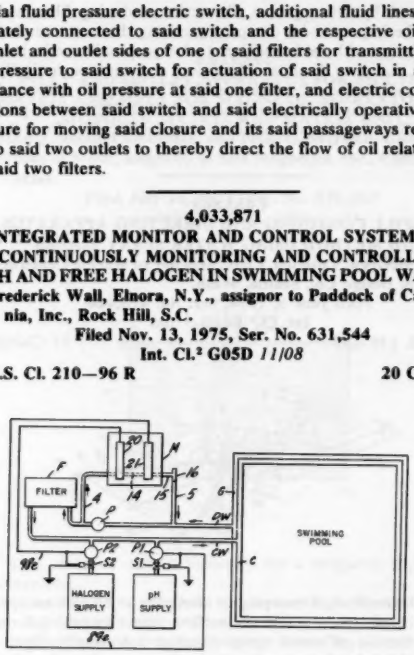
INTEGRATED MONITOR AND CONTROL SYSTEM FOR CONTINUOUSLY MONITORING AND CONTROLLING pH AND FREE HALOGEN IN SWIMMING POOL WATER

Frederick Wall, Elnora, N.Y., assignor to Paddock of California, Inc., Rock Hill, S.C.

Filed Nov. 13, 1975, Ser. No. 631,544

Int. Cl.² G05D *11/08*

U.S. Cl. 210—96 R **20 Claims**



1. A swimming pool system having pool water monitored for independent and concomitant control of halogen concentration and pH, comprising, in combination, a swimming pool; an integrated monitor and control system for continuously monitoring and independently controlling pH and free halogen in swimming pool water; and line connections for circulating swimming pool water flow therebetween; the monitor and control system comprising, in combination, a first electrochemical flow cell having two electrodes and through which swimming pool water flows, giving rise to an electric potential between the electrodes in proportion to hydrogen/hydroxyl ion concentration in the pool water; means for measuring the electric potential across the electrodes in a manner correlated with pH of the pool water; a second electrochemical flow cell having two electrodes and through which swimming pool water flows giving rise to an electric potential between the two electrodes in proportion to the oxidation/reduction potential of the pool water; means for measuring the electric potential across the electrodes in a manner correlated with halogen concentration in the pool water; a first operational amplifier in electric connection with the first cell and arranged to respond to a pH outside a predetermined range and give a first signal; a first means responsive to the first signal to adjust alkali or acid content of the pool water to restore pH to within the predetermined range; a second operational amplifier in electric connection with the second cell and arranged to respond to a halogen concentration outside a predetermined range and give a second signal; second means responsive to the second signal to adjust halogen concentration in the pool water to restore halogen concentration to within the predetermined range; and means for circulating pool water to, through and from each electrochemical cell and to and from a swimming pool water supply.

4,033,872

RESERVOIR TANK

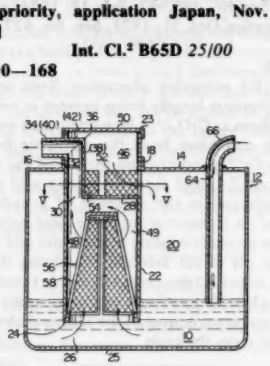
Yoshiro Mori, Sagamihara, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 7, 1975, Ser. No. 630,079

Claims priority, application Japan, Nov. 8, 1974, 49-134453[U]

Int. Cl.² B65D *25/00*

U.S. Cl. 210—168 **7 Claims**



1. A reservoir tank for use in a hydraulic system, comprising a tank top formed therethrough with a first aperture, a hollow member vertically extending from the outside of said tank thereinto through said first aperture and having therein a filling chamber, an outlet chamber located below said filling chamber, and an outlet passage located laterally of said filling chamber and above said outlet chamber and communicating with said outlet chamber, said hollow member having a bottom end which submerges into and communicates with hydraulic fluid in said tank, a horizontal partition member horizontally located in said hollow member and separating said filling chamber and said outlet chamber from each other, a vertical partition member fixedly connected to said horizontal partition member and vertically extending upwardly from said horizontal partition member and separating said filling chamber and said outlet passage from each other, said filling chamber communicating with the outside of said tank for delivery of hydraulic fluid thereinto, said hollow member being formed therethrough below said tank top with a second aperture opening from said filling chamber into said tank for admission of said hydraulic fluid in said filling chamber thereinto, said hollow member being formed therethrough above said tank top with a third aperture opening from said outlet passage into the outside of said tank.

4,033,873

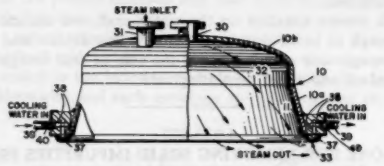
FILTRATION APPARATUS AND PRESSURE SEAL

Donald A. Stoltenberg, Park Ridge, Ill., assignor to Pureco Systems, Inc., Rosemont, Ill.

Continuation-in-part of Ser. No. 332,596, Feb. 15, 1973, Pat. No. 3,870,585. This application May 14, 1973, Ser. No. 359,646

Int. Cl.[2] B01D *35/18*

U.S. Cl. 210—186 2 Claims



1. Pressure filtration apparatus for removing solids from a saturated water solution thereof, including receiver vessel means for collection of the solids during pressure filtering, said vessel having an open bottom through which the solids are discharged, liquid-passing solids-retaining filter means cooperating with said open bottom to close it during filtration and open it for discharge of the collected solids, said filter means having gasket means around the periphery thereof, and sealing rim means extending around said open bottom for engagement with said gasket means during filtration, wherein the improvement comprises: the gasket engaging surface of said sealing rim means being formed of metal and said sealing rim means being provided internally with passage means in heat transfer relation with the inside of said metal gasket engaging surface, means for circulating cooling fluid through said passage means for cooling by heat transfer said external gasket engaging surface to a steam condensing temperature, means for providing a flow of steam over said external gasket engaging surface while said surface is disengaged from said gasket means and is being cooled by said circulating cooling fluid to condense water on said surface for preventing the drying of said saturated solution thereon, whereby effective sealing engagement between said sealing rim means and said gasket means can be maintained during pressure filtration.

4,033,874

APPARATUS FOR THE TREATMENT OF LIQUIDS

Kurt Marquardt, Holzgerlingen, and Reinhard Buchholz, Wendlingen, both of Germany, assignors to Hager & Elsaesser, Stuttgart, Germany

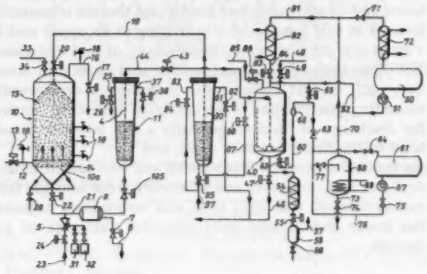
Continuation of Ser. No. 362,953, May 23, 1973, abandoned. This application Apr. 22, 1975, Ser. No. 570,926

Claims priority, application Germany, May 26, 1972, 2225682; Sept. 23, 1972, 2246792

Int. Cl.[2] B01D *33/30*

U.S. Cl. 210—189 1 Claim

1. Apparatus for separating solid substances from liquids comprising a treatment column containing a bed of treatment material, a solvent extraction column, a washing column, means for intermittently removing successive volumes of said material from the lower end of the treatment column and conveying said material into said solvent extraction column, means for removing portions of said material from said solvent extraction column and conveying said portions to the lower end of said washing column, means for intermittently removing successive volumes of said materials from said washing column and conveying said material to the upper end of said treatment column, means for supplying untreated liquid to the lower end of the treatment column, means for removing purified liquid from the upper end of the treatment column, means for supplying washing liquid to the lower end of the washing column, means for removing used washing liquid from the upper end of said washing column, said treatment column, solvent extraction column and said washing column and all said means being connected to form a closed system for said treatment material and means for supplying solvent to the solvent extraction column, means for removing used solvent from the solvent extraction column, volume-adjustment devices which comprise pipes protruding respectively into the treatment and washing columns and adjustable depthwise therein for adjusting both said volumes removed from the treatment column and from the washing column, said volume



adjustment devices being formed as telescopically guided pipe and pipe connection devices provided on the treatment and washing columns coupled to each pipe, said volume-adjustment device of the treatment column being formed as a hollow annular body located within the treatment column, said body openings therein and being in fluid connection with two pipes engaging the annular body at diametrically opposite positions, said pipes extending out of the treatment column and being adjustable as to height within the treatment column.

4,033,875

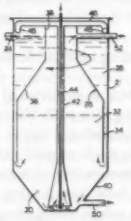
WASTE WATER TREATMENT APPARATUS

Ferdinand Besik, Mississauga, Canada, assignor to Ontario Research Foundation, Sheridan Park, Canada

Division of Ser. No. 542,716, Jan. 21, 1975. This application Nov. 8, 1976, Ser. No. 739,491

Int. Cl.[2] C02C *1/26*

U.S. Cl. 210—197 3 Claims



1. A waster water treatment apparatus for the treatment of waste water containing a plurality of contaminants comprising:

a substantially cylindrical container having a truncated conical shape at the lower end thereof,

a substantially funnel-shaped member located in inverted manner internally and axially of said container,

said funnel-shaped member including a skirt portion concentric with and spaced inwardly from the inner wall of said container, a throat portion concentric with said container and extending upwardly above the intended liquid level in said container and a truncated cone portion joining said skirt portion and said throat portion,

said throat portion and said truncated cone portion defining

with the inner wall of said cylindrical container a first treatment zone,

an inlet pipe to said cylindrical container communicating with said first treatment zone adjacent the intended liquid level therein,

an outlet pipe from said cylindrical container communicating with said throat portion at the intended liquid level therein for discharge of treated waste water,

a riser tube extending centrally and axially of and through said container terminating at its lower end adjacent the lower end of said container for receipt therein of material located at said lower end terminating at its upper end in a cross arm member extending radially of said container,

outlet pipes integral with each end of said cross arm member, each of said outlet pipes including a downwardly extending portion and a horizontally extending portion for discharge of fluid tangentially a the intended liquid level in the first treatment zone, and

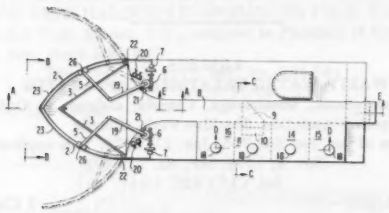
a gas feed tube communicating with gas feed means exteriorally of said container and extending from said gas feed means through said riser tube and terminating adjacent the lower end of said riser tube for discharge of gas therein.

4,033,876

SPILLED OIL RETRIEVER AND ANTI-WATER POLLUTION WATER CRAFT

Diosdado L. Cocjin, Quezon City, and Artemio M. Masongsong, Manila, both of Philippines, assignors to Diosdado L. Cocjin, Quezon City, Philippines

Filed Feb. 6, 1976, Ser. No. 655,937
Int. Cl.² E02B *15/04*
U.S. Cl. 210—242 S **3 Claims**



1. A water craft capable of retrieving oil or chemicals lighter than and floating on the water surface, said craft comprising, in combination:

flat sidewalls terminating at their forward ends in a pointed bow;

said bow being recessed at its forward and upper portion to define a scoop lying beneath the water craft line, said scoop including a horizontal upper wall;

a pair of hollow gates, each of said gates conforming to the bow scoop and consistuting sidewall extensions of said water craft at said bow and having vertical forward and rear edges, the rear edges being hinged to the sides of said water craft hull for rotation about vertical axes and movable between closed and open positions wherein the forward vertical edges are closed to form the water craft pointed bow and are open so as to extend outwardly to the plane of the hull sidewalls to cause oil and water to converge onto the horizontal surface of the scoop;

means mounted on the hull and operatively coupled to the gates for opening and closing said gates;

a trough located amidship of the water craft and extending through its entire length including a forward, oblique portion which is in communication with the horizontal surface of said scoop and which extends upwardly and terminates above the water line such that a portion of said trough lies above the water line at the rear of said gates;

an oil and water separating tank within said hull;

an opening formed within the side of said trough above the water craft water line and open to said oil and water separating tank;

an oil storage tank within said hull and adjacent said oil and water separating tank, said oil and water separating tank being provided with an oil overflow outlet at an upper portion leading to said oil storage tank; and a submerged water outlet at a lower portion of said oil and water separating tank and beneath the water line of said water craft and being open to the water exterior of said water craft for permitting separated water flow out of said water craft; and

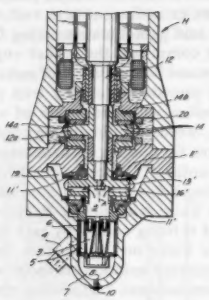
baffle means installed on the water craft and astride said trough to block water and oil flow and detour that flow through said opening within the side of said trough into said oil and water separating tank.

4,033,877

CYCLONE FOR REMOVING SOLID IMPURITIES FROM LIQUID IN A PUMP AND MOTOR UNIT

Christian Klepp; Günter Koll, and Heinz Bernd Matthias, all of Frankenthal, Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Pfalz, Germany

Filed July 22, 1975, Ser. No. 598,041
Claims priority, application Germany, July 22, 1974, 2435127
Int. Cl.² B01D *45/12*
U.S. Cl. 210—304 **7 Claims**



3. The improvement defined in claim 1 wherein said cover is formed with a sealable opening and is provided with a plug normally closing said opening, whereby access can be gained to said compartment through said opening after removal of said plug for removal of solids trapped by said cyclone separator.

4,033,878

SPIRAL WOUND MEMBRANE MODULE FOR DIRECT OSMOSIS SEPARATIONS

Gerald E. Foreman, San Diego, and Peter K. Worsley, Santa Barbara, both of Calif., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed May 12, 1975, Ser. No. 576,925
Int. Cl.² B01D *31/00*
U.S. Cl. 210—321 A **3 Claims**

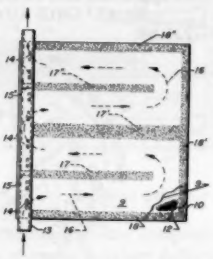
1. A spiral wound membrane separation module, which comprises in combination:

a. a hollow mandrel having at least one flow blocking means in the interior portion thereof and having longitudinally aligned passageway means on both sides of the flow blocking means extending through the wall portion of the mandrel;

b. a sheet-like layer of a first porous material provided in a spaced spiral wrapping around said mandrel and having one end in contact with the passageway means to the interior of said mandrel to permit fluid flow from one to the other;

c. said porous material further having elongated fluid flow blocking seal means incorporated within the interior portion thereof, with at least one such seal means in alignment with the flow blocking means in said mandrel and extending for a portion of the spiral wound length thereof in the manner of interior weir means, as well as fluid blocking means incorporated around the side and outer end portions thereof, whereby fluid flow will be caused to travel in at least one flow path that is from one mandrel portion out into the outer spiral wrapped length of the porous material and then back into another mandrel portion;

d. a pair of membrane sheets each positioned on an opposite side of said first porous material with outer edge portions sealed to the latter to provide an envelope arrangement therewith and such envelope spirally wrapped therewith



around said mandrel along with a layer of a second porous material, hereinafter described and set forth, to provide resulting membrane layers between spiral wound porous material layers;

e. a sheet-like layer of a second porous material interposed between said envelope and between the membranes in the spirally wund arrangement therewith to be thus spaced from said first porous material layer by one of said membranes in a resulting spiral wound module; and,

f. said spiral wound membrane module being further characterized in that a plurality of flow blocking means are spaced longitudinally in said mandrel and a corresponding plurality of flow blocking seal means are provided in the first said porous material to provide more than one outward and inward flow paths for the fluid flow in the envelope arrangement.

4,033,879

CENTRIFUGE, ESPECIALLY SUGAR CENTRIFUGE

Peter Natt, Braunschweig, and Heinrich Kurland, Lucklum, both of Germany, assignors to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

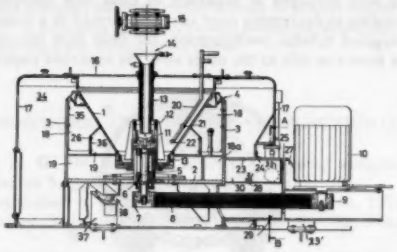
Filed July 15, 1975, Ser. No. 596,182

Claims priority, application Germany, July 26, 1974, 2436044

Int. Cl.² B01D *33/02*

U.S. Cl. 210—369 **10 Claims**

1. A centrifuge comprising a first unit and a second unit, said first unit comprising a base plate, spring support means for said base plate, drum means, means rotatably securing said drum means to said base plate while inhibiting nonrotational movement therebetween, said securing means including a drive shaft rotatably supported by and vertically extending through said base plate and rigidly secured to said drum, inner housing means supported by said base plate and surrounding said drum to form collecting chamber means around said drum for receiving liquid centrifuged from the drum, carrier means having an inner end rigidly secured to said inner housing and an outer end extending laterally away from said inner housing, motor means rigidly supported by said outer end of the carrier means, and means operatively connecting said motor means to said drive shaft for rotating said drive shaft, said spring support means operatively supporting said first unit independently of said second unit, said second unit comprising an outer housing separated from said inner housing, said outer housing being mounted to surround said inner housing to form an enclosed space around said inner housing to receive solid materials from said drum means, cover means for said outer



housing, and material filling means extending through said cover means into said drum means, said carrier means extending through said outer housing.

4,033,880

FILTER DEVICE

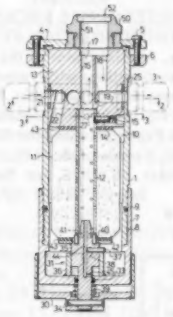
Göran Vilhelm Bengtsson, Pianogatan 84, S-421 44 Vastra Frolunda, Sweden

Filed Apr. 5, 1976, Ser. No. 673,778

Claims priority, application Sweden, Apr. 11, 1975, 7504194

Int. Cl.² B01D *29/42*

U.S. Cl. 210—424 **7 Claims**



1. A filter device, particularly a dry filter device for refrigerant in cooling systems, comprising a filter housing having a chamber containing a filter and a single inlet (2) into a chamber (10) and a single outlet (3) from said chamber (10), said chamber (10) having a sealable opening for allowing replacement of said filter in the chamber (10), and a valve means disposed between said inlet (2) and said outlet (3) and having a movable valve body (13), said valve body (13) having an operating position in which it establishes communication between said inlet (2) and said outlet (3) through the filter in said chamber (10), an evacuation position, in which it closes said inlet (2) and establishes communication between said chamber (10) and said outlet (3) only, and a service position, in which it establishes a communication between said inlet (2) and said outlet (3) by-passing said chamber (10) in order to maintain a flow of refrigerant from said inlet (2) to said outlet (3) during replacement of the filter.

4,033,881

MULTILAYER PAPER SHEET FILTER CARTRIDGES

David B. Pall, Roslyn Estates, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

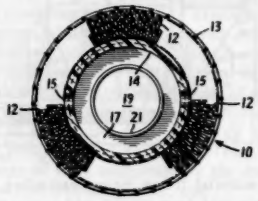
Continuation-in-part of Ser. No. 538,972, Jan. 6, 1975, abandoned. This application Jan. 12, 1976, Ser. No. 648,553

Int. Cl.² B01D *39/18*

U.S. Cl. 210—491 **8 Claims**

1. A tubular filter cartridge comprising a tube having open ends closed off by end caps, with at least one of the end caps

provided with at least one aperture for fluid flow therethrough into the interior of the tube, the tube comprising a plurality of separate unattached juxtaposed paper filter sheets of differing pore size, arranged in sequence of fluid flow therethrough according to decreasing pore size, and formed in a concentric corrugated tubular configuration, for fluid flow through the tube from one side to the other side, the separtate paper filter

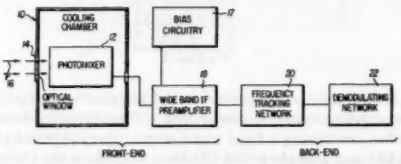


sheets comprising cellulose fibers exclusively, substantially free from binder, being from about 0.001 to about 0.02 inch thick, and having a density within the range from about 0.1 to about 0.75 g per cc, with at least one foraminous corrugated relatively rigid separate unattached support member in supporting juxtaposition to at least one of the outermost and innermost sheets of the tube.

4,033,882
WIDEBAND HETERODYNE RECEIVER FOR LASER COMMUNICATION SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Theodore Flattau, Dix Hills, N.Y.; Ronald Albert Lange, Huntington, N.Y.; John Walter Mellars, Westbury, N.Y.; Bernard Joseph Peyton, Huntington Station, N.Y., and John Martin Wolczok, Farmingdale, N.Y.

Filed Mar. 18, 1976, Ser. No. 667,930
Int. Cl.² H03D 1/24
U.S. Cl. 250—199 **9 Claims**



1. A wideband receiver for a laser communication system, comprising:

wideband optical transducer means for detecting modulated optical signals over a predetermined range of carrier frequencies and for converting said optical signals to electrical signals;

wideband preamplifier means coupled to said optical transducer means for amplifying the output thereof; and

narrow band signal processing and demodulating means coupled to said preamplifier means for processing and demodulating said electrical signals including;

heterodyne demodulating means for demodulating said electrical signals,

frequency tracking means coupled to said heterodyne demodulating means for adjusting said heterodyne demodulating means in accordance with changes in said carrier frequency of said detected signal,

first mixer means coupled to said preamplifier means for mixing a variable intermediate frequency with the output of said preamplifier means,

frequency tracking feedback loop means coupled to said first mixer means for varying said intermediate frequency in response to changes in said carrier frequency of said detected signals,

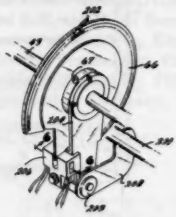
linear band pass filter means coupled to said first mixer means for filtering the output thereof, and

wherein said heterodyne demodulating means includes fourth mixer means coupled to said linear band pass filter means for demodulating the output thereof and binary decision circuit means coupled to said fourth mixer means for supplying binary logic levels to the output thereof.

4,033,883
CONTROL AND DATA SYSTEM

Herbert G. Zinsmeyer; Rodney L. Johnson, both of Austin; Ralph H. Genz, Leander, and James E. Setliff, Austin, all of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Division of Ser. No. 434,196, Jan. 17, 1974, which is a continuation-in-part of Ser. No. 398,987, Sept. 20, 1973, abandoned. This application Oct. 9, 1975, Ser. No. 621,259
Int. Cl.² G01D 5/34
U.S. Cl. 250—231 SE **6 Claims**

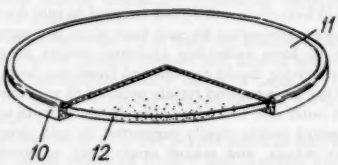


1. In combination in a dispenser at a gasoline station for producing electrical signals representing the amount of energy fluid dispensed by the dispenser, a first shaft operably connected to the dispenser for rotation thereby in an amount correlated with the amount of fluid dispensed, a second stationary shaft displaced from the first shaft, brace means mounted at one end on the second stationary shaft, means defining a forked frame mounted at one end on the first shaft rotationally free of the first shaft, the forked frame means being attached to the brace means at a position removed from the first shaft and the second stationary shaft, a rotary disc supported on the first shaft between the fork legs of the frame means for rotation with the first shaft, the rotary disc having a plurality of uniformly spaced apertures provided in an annular path of orbit near its periphery, and photocell means disposed on the frame for scanning the apertures in the disc rotates to provide a plurality of electrical signals each representing a predetermined increment in the amount of energy fluid dispensed by the dispenser.

4,033,884
CALIBRATION SOURCE

Edgar Adolf Lorch; Keith Ernest Fletcher, and David Page, all of Amersham, England, assignors to The Radiochemical Centre Limited, Amersham, England

Filed Jan. 24, 1975, Ser. No. 543,908
Claims priority, application United Kingdom, Jan. 28, 1974, 3951/74
Int. Cl.² G21F 5/02
U.S. Cl. 250—496 **7 Claims**



1. A flood source for calibrating gamma-cameras, said source comprising:

a plastics sheet of uniform thickness containing the nuclide tellurium-123m uniformly dispersed therein.

4,033,885

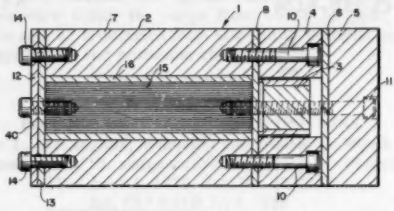
APPARATUS FOR COLLIMATION OF RADIATION SIGNALS FOR LONG DISTANCE TRANSMISSION AND METHOD OF CONSTRUCTION THEREFOR

Leonard R. Stone, South Euclid; Steven J. Aron, Jr., Parma, and Robert A. Kemmerling, Cleveland Heights, all of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Continuation of Ser. No. 381,671, July 23, 1973, abandoned. This application Dec. 30, 1974, Ser. No. 537,458

Int. Cl.² G21F *5/02*

U.S. Cl. 250—496 **3 Claims**



1. A source assembly for a radiation detector comprising:
a. a collimator shielding body;
b. an elongated collimator assembly comprising a series of radiation opaque elongate members defining a plurality of parallel elongated gamma transmitting passages;
c. said collimator assembly being axially received in said body;
d. a gamma outlet window secured to said collimator shielding body and overlying an outlet end of said collimator assembly;
e. gamma inlet window secured to said collimator body in spaced relationship with the outlet window and overlying an inlet end of said collimator assembly;
f. a tubular source shield secured to the collimator body and defining a source chamber adjacent the inlet window;
g. a radiation source in the chamber and having a radiation face near said inlet window and aligned with said collimator assembly to emit gamma radiation through said elongated passages; and,
h. a shielding cap removably secured to the shield body to permit facile replacement of the source while preventing emission of radiation rearwardly of the shielding body when the assembly is in use.

4,033,886

RECYCLEABLE METALWORKING LIQUID

George F. Felton, Jr., Chadds Ford, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Continuation-in-part of Ser. No. 545,845, Jan. 31, 1975, abandoned. This application Nov. 11, 1975, Ser. No. 630,823

Int. Cl.² C10M *1/32*

U.S. Cl. 252—34.7 **23 Claims**

1. A liquid suitable for the formulation of a recycleable metal working liquid comprising a major amount of an aqueous solution of a liquid block copolymer of ethylene oxide and propylene oxide, said copolymer having a molecular weight of about 1800–2900, and an amount of both an alkanolamine cinnamate and a boron amine complex effective to inhibit corrosion and which complex is the reaction complex between methyl borate or phenyl borate and one of the following: trimethylamine, ammonia, hydrazine and primary aliphatic hydrocarbyl amine.

12. In a method for metal working wherein relatively small amounts of metal are removed from an article and a metal working fluid is juxtaposed to contacting surfaces, the improvement comprises that the liquid comprises a major amount of an aqueous solution of a liquid block copolymer of ethylene oxide and propylene oxide, said copolymer having a molecular weight of about 1800–2900 and an effective amount of both an alkanolamine cinnamate and a boron amine complex to inhibit corrosion and which complex is the reaction complex between methyl borate or phenyl borate and one of the following: trimethylamine, ammonia, hydrazine and primary aliphatic hydrocarbyl amine.

4,033,887

PHOSPHORIC ACID ESTER BASED FUNCTIONAL FLUIDS

Alain J. G. De Roocker, Brussels, Belgium, assignor to Labofina S.A., Brussels, Belgium

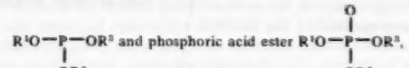
Continuation-in-part of Ser. No. 407,539, Oct. 18, 1973, abandoned. This application May 16, 1975, Ser. No. 578,075

Int. Cl.² C10M *1/10*

Claims priority, application Belgium, July 13, 1973, 802298

U.S. Cl. 252—49.8 **11 Claims**

1. A functional fluid comprising a mixture of a major amount of (A) an orthophosphoric acid ester of formula $O=P=(OR)_3$, wherein R is an alkyl radical, an aryl radical or an alkylaryl radical, and a viscosity improving amount of (B) a transesterification product between a dihydroxy aromatic compound selected from the group consisting of hydroquinone, resorcinol, pyrocatechol, 2,2'bis (4-hydroxy-phenyl)-propane and bis(4-hydroxyphenyl) methane and a phosphorous compound selected from the group consisting of the phosphorous acid ester



wherein R^1, R^2 and R^3, which may be the same or different, are alkyl radicals, aryl radicals or alkylaryl radicals, wherein said transesterification product contains not more than about 4 structural units and has a molecular weight of between about 500 and 2000.

4,033,888

DISPERSANT VI IMPROVER

Thomas E. Kiovsky, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 18, 1976, Ser. No. 733,574

Int. Cl.² C10M *1/24*

U.S. Cl. 252—56 D **8 Claims**

1. The oil-soluble product prepared by the process comprising:
a. reacting a selectively hydrogenated block copolymer having the general configuration A-B with maleic anhydride at a temperature of between about 180° C and 250° C and in the presence of a solvent wherein each polymer block A is a monoalkenylarene polymer having an average molecular weight of between about 25,000 and about 50,000 and each block B is a polymer of a C_{4-5} conjugated diene having an average molecular weight of between about 35,000 and about 100,000 wherein between about 80% and about 98% of the aliphatic unsaturation has been reduced by hydrogenation while less than about 20% of the aromatic unsaturation has been reduced; and
b. reacting the product of step (a) with an alkane polyol having at least two hydroxy groups at a temperature of between about 150° C and about 250° C.

4,033,889

TERPOLYMER DISPERSANT - VI IMPROVER

Thomas E. Kiovsky, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 18, 1976, Ser. No. 733,573

Int. Cl.² C10M *1/28, 3/22*

U.S. Cl. 252—56 D **10 Claims**

1. The oil-soluble product prepared by the process comprising:

a. reacting a terpolymer with maleic anhydride at a temperature of between about 180° C and 250° C wherein the terpolymer has a molecular weight of between about 70,000 and 150,000 and comprises about 30 to 85 mole percent ethylene, about 15 to 70 mole percent of a C_3 to C_8 alpha monoolefin and about 1 to about 20 mole percent of a C_5 to C_{14} non-conjugated diene; and

b. reacting the product of step (a) with an alkane polyol having at least two hydroxy groups at a temperature of between about 150° C and about 250° C.

4,033,890

LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY

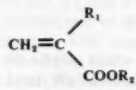
Yasuo Tamai, Odawara; Satoru Honjo, Asaka; Sadao Osawa, Asaka; Masato Satomura, Asaka; Chiaki Osada, Asaka; Wakio Nagashima, Kanagawa, and Naomitsu Takashina, Fujisawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara and Mitsubishi Gas Chemical Company, Inc., Tokyo, both of, Japan

Filed Feb. 26, 1975, Ser. No. 553,202

Int. Cl.² G03G 9/00

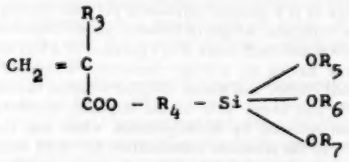
U.S. Cl. 252—62.1 L **10 Claims**

1. An electrophotographic liquid developer comprising an insulating carrier liquid having a high electric resistance and a low dielectric constant and a toner in a proportion of about 0.1 to about 20 parts by weight of said toner per 1,000 parts by weight of said carrier liquid, said toner comprising the graft-copolymer of (a) and addition-polmerizable monomer (A) represented by the formula:

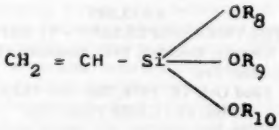


where R_1 represents a hydrogen atom or a methyl group and R_2 represents an alkyl group having 6 to 20 carbon atoms, and (b) an addition-polymerizable monomer (B) having an alkoxysilane group or a phenoxysilane group, and pigment particles selected from the group consisting of carbon black, aniline black, alkali blue, nigrosine, phthalocyanine blue and phthalocyanine green, with the proportion of addition polymerizable monomer (A) to addition polymerizable monomer (B) being 5 to 45 parts by weight of addition polymerizable monomer (A) per 1 part by weight of addition polymerizable monomer (B) and with the amount of addition polymerizable monomer (A) and addition polymerizable monomer (B) grafted to the pigment particles being sufficient to provide the pigment particles with an effective positive charge.

2. The developer of Claim **1** where said addition-polymerizable monomer (B) is represented by the formula:



where R_3 is a hydrogen atom or a methyl group, R_4 is an alkylene group having 1 to 8 carbon atoms, and R_5, R_6 and R_7 each is an alkyl group having 1 to 4 carbon atoms or a phenyl group; or



where R_8, R_9 and R_{10} each is a phenyl group, an alkyl group having 1 to 4 carbon atoms or a $—CH_2—CH_2—OR_{11}$ group wherein R_{11} represents a phenyl group or an alkyl group having 1 to 4 carbon atoms.

4,033,891

MAGNETIC PARTICLE POWDER OF ACICULAR FERRIC OXIDE USED FOR MAGNETIC RECORDING MATERIAL AND A PROCESS FOR PRODUCING THE SAME

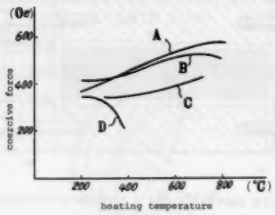
Goro Matsui; Koji Toda; Shigeki Shimizu; Nanao Horiishi, and Atushi Takedoi, all of Hiroshima, Japan, assignors to Toda Kogyo Corporation, Hiroshima, Japan

Filed Feb. 26, 1975, Ser. No. 553,325

Claims priority, application Japan, Mar. 1, 1974, 49-24519

Int. Cl.² C01G 49/06

U.S. Cl. 252—62.56 **6 Claims**



1. In the production of acicular gamma-ferromagnetic iron oxide from acicular goethite, wherein the acicular goethite is reduced to acicular magnetite and the resultant magnetite is oxidized to gamma-hematite retaining the particle shape of the starting material, the improvement for obtaining gamma-hematite having improved magnetic properties which comprises heating the acicular magnetite obtained from the reduction of the acicular goethite, prior to subjecting it to oxidation, at a constant temperature in the range of 200°–800° C in an inert gas atmosphere having a partial pressure of oxygen controlled at a constant value in the range of 0.001–1% by weight and for the time sufficient to make the partial pressure of the acicular magnetite reach the equilibrium value according to Gibb's phase rule under said conditions.

4,033,892

ELECTRIC FIELD RESPONSIVE FLUIDS

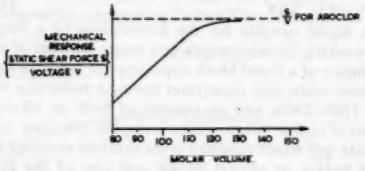
James Edward Stangroom, Castleton, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, Whitehall, London, England

Filed July 7, 1975, Ser. No. 593,494

Claims priority, application United Kingdom, July 9, 1974, 30456/74

Int. Cl.² C10M 3/34, 3/18; C09K 3/00

U.S. Cl. 252—76 **21 Claims**



1. An electroviscous fluid which comprises at least one polyhydric alcohol in solid particulate form which polyhydric alcohol contains acid groups selected from the group consisting of carboxylic acid groups and sulphonic acid groups and has a structure in which water is adsorbed, and an electrically non-conducting oleaginous vehicle in which the solid particles are dispersed.

4,033,893
POTASSIUM-LIME AQUEOUS DRILLING FLUIDS AND METHOD OF PREPARING SAME

Thomas C. Mondshine, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Filed Nov. 20, 1975, Ser. No. 633,867
Int. Cl.² C09K *7/00*
U.S. Cl. 252—8.5 A **16 Claims**

1. A drilling fluid consisting essentially of a suspension of clay, lime, and a lignitic material in an aqueous phase, said drilling fluid having a Pm in the range from 1 to 40 and a pH in the range from 12.4 to 13.5, said aqueous phase being saturated with lime and having a Pf in the range from 1 to 8, and a K^+ concentration of at least 8000 ppm., wherein Pm>Pf, and wherein said lignitic material is present in a concentration within the range from 10 to 35 ppb., and wherein said K^+ is obtained from said lignitic material, potassium hydroxide, and potassium chloride.

4,033,894
POWDER DETERGENT COMPOSITIONS

Robert L. McLaughlin, Wilmette, and Donald C. Wood, Des Plaines, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed June 5, 1975, Ser. No. 583,908
Int. Cl.³ C11D *7/18, 7/38*
U.S. Cl. 252—99 **18 Claims**

1. A powder detergent composition adapted for machine dish washing using hard water and which does not require the presence of phosphates consisting essentially of the following components by weight:
   1. from 2–8% of low foaming nonionic surfactant useful for machine dish washing,
   2. from 0.5–5% of a chlorine or oxygen-supplying bleaching agent,
   3. from 15–85% of borax,
   4. solid particulate organic or inorganic buffering agent which will not precipitate calcium or magnesium salts at use concentration, said buffering agent providing a pH in the range of pH 7.8 – pH 8.5 when the composition is placed in 1% water solution, and
   5. any balance of said detergent consisting essentially of inert particulate filler which does not precipitate calcium or magnesium salts at use concentration.

4,033,895
NON-IRRITATING SHAMPOO COMPOSITIONS CONTAINING STEARYL AMINE OXIDE

Terry Gerstein, Merrick, N.Y., assignor to Revlon, Inc., New York, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,131
Int. Cl.³ C11D *1/14, 3/48, 1/84*
U.S. Cl. 252—106 **6 Claims**

1. An aqueous non-irritating shampoo consisting essentially in parts by weight of

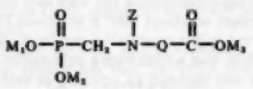
sodium lauryl sulfate	4–18
zinc pyridinethione	0.1–4
stearyl dimethyl amine oxide	0.2–12
water q.s.	100

4,033,896
METHOD OF CORROSION INHIBITION AND COMPOSITIONS THEREFOR

Robert S. Mitchell, Webster Groves, and Thomas M. King, Creve Coeur, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed June 18, 1976, Ser. No. 697,503
Int. Cl.³ C23F *11/16, 11/10*
U.S. Cl. 252—389 A **35 Claims**

1. A method of inhibiting the corrosion of metals in a water system comprising maintaining in the water of said system at least 1 part per million of phosphonomethyl amino carboxylate having the general formula



wherein M_1, M_2 and M_3 are individually selected from the group consisting of hydrogen, metal ions, ammonium ions, and alkyl ammonium ions containing up to about 10 carbon atoms; Z is $-CH_2PO_3M_1M_2$, C_{1-4} alkanol, C_{1-4} alkyl carboxylic acid or C_{1-10} alkaminomethylene phosphonic acid; and Q is selected from the group consisting of C_{3-15} alkylene, C_{3-15} alkenylene, and alkaryl radicals.

4,033,897
FLASH POINT DETERMINATION CALIBRATION STANDARDS

Alfred J. Barnard, Jr., and Russell C. Lance, Jr., both of Bethlehem, Pa., assignors to J. T. Baker Chemical Company, Phillipsburg, N.J.

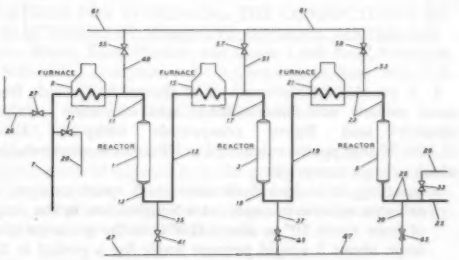
Filed Apr. 19, 1976, Ser. No. 678,228
Int. Cl.² C09K *3/00*; G01N *25/52*
U.S. Cl. 252—408 **5 Claims**

1. A flash point determination reference standard calibration mixture for a flash point calibration temperature of 73° F., said standard calibration mixture not exhibiting any substantial change in the flash point value on partial evaporation of the mixture and consisting essentially of a mixture of about 76% by weight ethylbenzene and about 24% by weight m-xylene.

4,033,898
IN SITU HYDROCARBON CONVERSION CATALYST REGENERATION WITHOUT SULFUR CONTAMINATION OF VESSELS COMMUNICATING WITH CATALYST REACTOR

Robert L. Jacobson, Pinole, and Robert M. Ormiston, San Anselmo, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Dec. 22, 1975, Ser. No. 643,581
Int. Cl.² B01J *21/20, 23/96*; C10G *35/08*
U.S. Cl. 252—416 **6 Claims**



1. A process for regenerating a catalyst contaminated with carbonaceous deposits in situ in a catalytic hydrocarbon conversion unit including a reactor vessel containing a bed of catalyst comprising a Group VIII metal on an alumina carrier and including a sulfur-contaminatable vessel communicating with said reactor by a conduit, wherein said catalyst has previously become at least partially deactivated by contact with a sulfur-containing hydrocarbon, a process for removing sulfur from said unit comprising the steps of:
   a. burning substantially all of the carbonaceous deposits on the catalyst and forming sulfur dioxide in said unit by passing an oxygen-containing gas stream through said reactor in contact with said bed of catalyst and through said sulfur-contaminatable vessel, at a temperature of

about 500° F to about 1000° F, and removing the resulting gas from said unit;

b. forming a sulfur-containing gas in said reactor by contacting a hydrogen-containing gas with said bed of catalyst at a temperature of about 500° F to about 1000° F, passing the resulting sulfur-containing gas from said reactor into said conduit, and withdrawing said sulfur-containing gas from said unit through an opening in said conduit; and

c. continuously passing a stream of an inert gas through said sulfur-contaminatable vessel into said conduit and through said conduit toward said reactor at a rate sufficient to prevent substantially all said sulfur-containing gas from entering said sulfur-contaminatable vessel while carrying out step (b), and withdrawing said inert gas stream from said conduit in admixture with said sulfur-containing gas.

5. A process according to claim 1 wherein said vessel comprises a furnace.

6. A process according to claim 5 wherein said vessel further includes a second reactor containing a second bed of said catalyst, said second reactor communicating with said furnace.

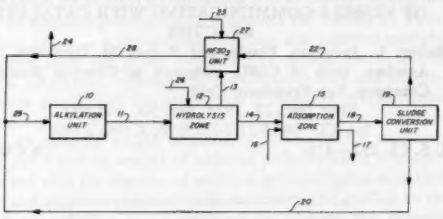
4,033,899
ALKYLATION FLUOSULFONIC-SULFURIC ACID CATALYST RECOVERY PROCESS WITH SILICA-ALUMINA REMOVAL OF FLUORIDE COMPOUNDS

Richard H. Bennett; Byron V. Klock, and James W. Brockington, all of Richmond, Va., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 537,631, Dec. 30, 1974, abandoned. This application Dec. 18, 1975, Ser. No. 641,804

Int. Cl.² B01J *37/00*; C01B *17/46*; C07C *3/54*

U.S. Cl. 252—420 **5 Claims**



1. A process for the removal of fluoro compounds from spent sulfuric acid-fluorosulfonic acid alkylation catalyst, wherein said fluoro compounds comprise about 15,000–30,000 ppmw, calculated as HF, of said spent catalyst; which process comprises:

a. reacting, in a hydrolysis zone, said spent catalyst, at sub-atmospheric pressure, at a temperature in the range of from about 50° to about 120° C in the presence of at least; about 3 weight percent water for a period in the range of about 1–8 hours, for production of a first vapor phase comprising mainly hydrogen fluoride and a first liquid phase comprising sulfuric acid, and containing about 800 ppm or less fluoro compounds;

b. contacting, in an adsorption zone, said first liquid phase with a fluidizable silica-alumina cracking catalyst in an amount equivalent to about 0.3–5 weight percent of said first liquid phase for a period of time in the range of about 1–8 hours, at a temperature in the range of about 50°–120° C for production of a second liquid phase comprising said cracking catalyst containing fluoro compounds; and

c. separating, in a solid-liquid separation zone, said second liquid phase from said first solid phase for production of an effluent acid containing the greater part of said sulfuric acid present in said spent catalyst and containing about 10 ppmw or less fluoride compounds.

4. A process for the regeneration of spent sulfuric acid-fluorosulfonic acid alkylation catalyst containing about 15,000–30,000 ppmw, calculated as HF, fluoro compounds, which process comprises:

a. reacting, in a hydrolysis zone, said spent alkylation catalyst, at subatmospheric pressure, at a temperature in the range of from about 80° to about 110° C in the presence of of about 3–15 weight percent water for a period in the range of about 4–8 hours, for production of a first vapor phase comprising mainly hydrogen fluoride and a first liquid phase comprising sulfuric acid and containing about 800 ppm or less residual fluoro compounds;

b. flowing said first vapor phase overhead from said hydrolysis zone into a fluorosulfonic acid generation zone;

c. treating said first vapor phase with sulfur trioxide to form regenerated fluorosulfonic acid from said hydrogen fluoride present in said first vapor fraction;

d. flowing said first liquid phase from said hydrolysis zone into an adsorption zone;

e. contacting, in said adsorption zone, said first liquid phase with a fluidizable silica-alumina cracking catalyst in an amount equivalent to about 0.3–5.0 weight percent of said first liquid phase for a period of time in the range of about 1–8 hours, at a temperature in the range of about 50°–120° C sufficient to react a major portion of said residual fluoro compounds with said cracking catalyst for production of a second liquid phase comprising sulfuric acid and containing 10 ppm or less fluoro compounds;

f. separating, in a solid-liquid separation zone, said second liquid phase from said cracking catalyst for production of an effluent acid free of cracking catalyst, comprising sulfuric acid and containing about 10 ppmw or less fluoro compounds;

g. combusting said effluent acid to convert said sulfuric acid to sulfur dioxide;

h. converting at least a portion of said sulfur dioxide to sulfur trioxide;

i. absorbing a portion of said sulfur trioxide from step (h) into a sulfuric acid solution for production of regenerated sulfuric acid;

j. flowing a portion of said sulfur trioxide from step (h) to said fluorosulfonic acid regeneration zone of step (c); and

k. combining said regenerated fluorosulfonic acid with said regenerated sulfuric acid acid in a weight ratio of from about 0.11/1 to about 0.32/1 respectively to produce fresh alkylation catalyst.

4,033,900
COMPOSITION USEFUL IN ANIONIC POLYMERIZATION

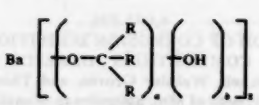
Ivan Glen Hargis, Tallmadge; Russell Anthony Livigni, and Sundar Lal Aggarwal, both of Akron, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 593,579, July 7, 1975, Pat. No. 3,992,561. This application Apr. 23, 1976, Ser. No. 679,634

Int. Cl.² C08F *4/48*

U.S. Cl. 252—431 L **12 Claims**

1. A composition of matter useful in anionic polymerization and comprising a complex of (1)



where at least one R is a methyl or cyclohexyl radical and where the remaining Rs are selected from the group consisting of alkyl and cycloalkyl radicals having from 1 to 6 carbon atoms which may be the same or different and where the mol ratio of *a* to *b* is from about 99.5:0.5 to 88:12 and (2) R'Li in

which R' is selected from the group consisting of normal, secondary and tertiary alkyl and cycloalkyl radicals having from 2 to 20 carbon atoms, the mol ratio of (1) to (2), based on barium metal and lithium metal, being from about 0.30:1 to 0.75:1.

4,033,901

SHAPED, BONDED BORIDE CATALYSTS

Ernest P. Buinicky, Newburgh; Joseph A. Durkin, Fishkill, and John H. Estes, Wappingers Falls, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 6, 1976, Ser. No. 656,048

Int. Cl.² B01J 21/02, 23/16; C04B 35/58, 35/00

U.S. Cl. 252—432 5 Claims

1. A shaped catalyst material having improved crush strength for catalyzing the liquid phase epoxidation of an olefin having from about 2 to about 60 carbon atoms with an organic hydroperoxide to the corresponding oxirane, consisting essentially of 80 to 95 percent by weight of finely divided particles of tungsten boride intimately bonded by 5 to 20 percent by weight of preoxidized aluminum powder having an oxide coating constituting from 5 to 10 percent by volume of said powder.

4,033,902

COBALT-PLATINUM CATALYST

Guenther Fritz Lengnick, Adrian, Mich., assignor to SWS Silicones Corporation, Adrian, Mich.

Continuation-in-part of Ser. No. 471,750, April 20, 1974, abandoned, which is a continuation of Ser. No. 273,676, July 20, 1972, abandoned, which is a division of Ser. No. 214,445, Dec. 30, 1971, Pat. No. 3,714,212. This application July 21, 1975, Ser. No. 597,940

Int. Cl.² B01J 27/06, 27/20; C01G 1/04; C01B 9/00

U.S. Cl. 252—441 4 Claims

1. A method for preparing a cobalt-platinum catalyst which will catalyze the addition of SiH containing compounds to unsaturated organic compounds which consists essentially of reacting platinum dichloride with dicobalt octacarbonyl in a 1:1 mol ratio in the presence of an ether solvent having a boiling point up to about 102° C and at a temperature up to about 52° C.

4,033,903

PROCESS FOR PREPARING MODIFIED SILVER CATALYSTS

Ian E. Maxwell, Haarlem, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 19, 1976, Ser. No. 678,106

Claims priority, application United Kingdom, Mar. 25, 1976, 12129/76

Int. Cl.² B01J 23/50

U.S. Cl. 252—476 2 Claims

1. A process for preparing modified silver catalyst which comprises

(a) heating a catalyst comprising from about 1 to about 35 percent by weight of the total catalyst of silver on a porous refractory support to a temperature between about 150° C to about 900° C;

b. impregnating the catalyst of step (a) with a solution comprising a solvent and a salt of an alkali metal wherein the cation is selected from the group consisting of potassium, rubidium, cesium or mixtures thereof, and the anion is selected from the group consisting of hydroxides, chlorides, iodides, bromides, bicarbonates, carbonates, alkoxides, acetates, oxalates, tartrates and lactates, the amount of said salt being sufficient to deposit on said support from about 0.00004 to about 0.008 gram equivalent weight per kilogram of total catalyst of said alkali metal, and,

c. removing said solvent from the impregnated support.

4,033,904

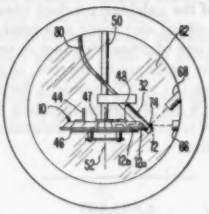
INTERCHANGEABLE SPECIMEN TRAYS AND APPARATUS FOR A VACUUM TYPE TESTING SYSTEM

Robert L. Gerlach, Los Altos, and George D. Rossini, Mountain View, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 453,749, March 22, 1974, abandoned. This application Dec. 24, 1975, Ser. No. 644,284

Int. Cl.² G21K 5/06

U.S. Cl. 250—491 16 Claims



1. In apparatus for examining samples: vacuum envelope means defining a vacuum chamber, an axially elongated shaft rotatively mounted in the chamber, a radially extending sample holder support affixed to the shaft, a sample holder removably mounted on the support coaxially of the shaft and having a radially extending slot in which the shaft is received, said sample holder having a plurality of sample receiving zones spaced peripherally of the holder a predetermined distance from the center thereof, a sealable aperture in the envelope means permitting installation and removal of the sample holder, a test probe constrained for rotation with the sample holder support, said test probe being positioned in the slot and aligned with the sample zones, a radiation source for directing radiation to a stationary target zone at the periphery of the sample holder, means for rotating the shaft and support to rotate the sample holder and thereby selectively align the test probe or one of the sample zones with the target zone, and examining means responsive to the effect of radiation on a sample in the target zone.

4,033,905

METHOD FOR INCREASING THE CONDUCTIVITY OF ELECTRICALLY RESISTIVE ORGANIC MATERIALS

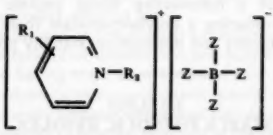
Allen Bloom, East Windsor, and Daniel Louis Ross, Princeton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 5, 1975, Ser. No. 629,086

Int. Cl.² H01B 1/00

U.S. Cl. 252—500 9 Claims

1. A method for increasing the conductivity of resistive organic material selected from the group consisting of silicone rubber, polyester thermoplastic resin and liquid crystals, which comprises adding to said organic material a resistivity-lowering compound of the formula:



wherein

R_1 is selected from the group consisting of hydrogen, C_1-C_4 alkyl, and phenyl-substituted C_1-C_4 alkyl

R_2 is an alkyl group having 8–20 carbon atoms; and

Z is selected from the group consisting of phenyl, and C_1-C_4 alkyl-substituted phenyl.

4,033,906

CERAMICS HAVING NONLINEAR VOLTAGE CHARACTERISTICS AND METHOD FOR PRODUCING SAME

Ikuo Nagasawa, and Kazuo Mukae, both of Kawasaki, Japan, assignors to Fuji Electric Company Ltd., Kawasaki, Japan

Filed June 3, 1975, Ser. No. 583,358

Claims priority, application Japan, June 3, 1974, 49-62656; June 3, 1974, 49-62657

Int. Cl.² C04B *35/00;* H01C *7 /10*

U.S. Cl. 252—519 11 Claims

1. A ceramic having non-linear voltage characteristics consisting essentially of the calcined product obtained on calcining in air a mixture of (a) zinc oxide as a principal component and (b) cobalt plus one of praseodymium or terbium, either in elemental form or as a compound thereof, as subcomponents, in an amount of from 0.1 to 8.0 atomic % for the cobalt, from 0.08 to 8.0 atomic % for the praseodymium and from 0.1 to 8.0 atomic % for the terbium, each calculated as cobalt, praseodymium and terbium.

4,033,907

RECLAIMING WASTE PLASTICS

William D. Wolf, Simsbury, Conn., assignor to Monsanto Company, St. Louis, Mo.

Filed July 7, 1975, Ser. No. 593,604

Int. Cl.² C08J *11/04*

U.S. Cl. 260—2.3 9 Claims

1. In a process for recycling non-cellular molecularly oriented thermoplastic material which includes the steps of:

reducing the material to the form of platelets; and

melt processing such material via a rotating screw during refabrication of articles therefrom;

the improvement in said process comprising, in combination, the step of:

heating the molecularly oriented platelets to within the molecular orientation temperature range of the thermoplastic material prior to such melt processing to relieve stresses in the platelets without causing substantial fusing of adjacent platelets whereby the surface area is decreased to improve the screw feeding characteristics.

4,033,908

POLYISOCYANURATE COMPOSITIONS AND FOAMS OF IMPROVED FRIABILITY AND PROCESS OF PREPARING SAME

Henry S. Hopkins, Jr., Ashland, Ohio, and Donald L. Vargo, Blama, Sierra Leone, assignors to General Latex and Chemical Corporation, Cambridge, Mass.

Filed Aug. 25, 1975, Ser. No. 607,201

Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AW 19 Claims

1. In a process of preparing a polyisocyanurate foam, which process comprises: reacting a polyisocyanate in the presence of a trimerization catalyst and an expanding amount of an inert blowing agent in a foamable composition to provide a polyisocyanurate foam, the improvement which comprises:

carrying out the reaction in the presence of a plasticizing amount of a nonreactive liquid organic carbonate, thereby producing a polyisocyanurate foam having improved friability and dimensional stability properties.

4,033,909

STABLE PHENOLIC RESOLES

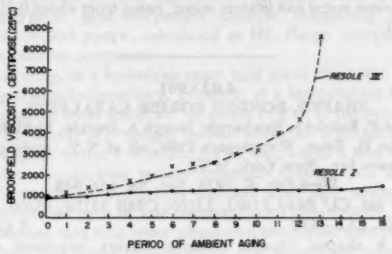
Anthony Joseph Papa, Saint Albans, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 497,072, Aug. 13, 1974, abandoned. This application July 14, 1975, Ser. No. 595,744

Int. Cl.² C08G *8/08, 8/10;* C08J *9/00*

U.S. Cl. 260—2.5 F 34 Claims

1. Foamable phenolic resoles which are free of ionic species removable by the free acid form of a cation exchange resin and the hydroxyl form of a strongly basic anion exchange resin



and having a water content of no more than about 10 weight percent.

4,033,910

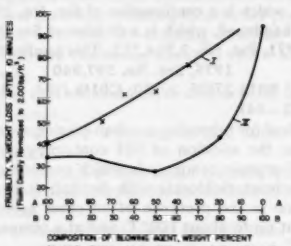
METHYL FORMATE AS AN ADJUVANT IN PHENOLIC FOAM FORMATION

Anthony Joseph Papa, Saint Albans, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Sept. 26, 1975, Ser. No. 617,243

Int. Cl.² C08J *9/14*

U.S. Cl. 260—2.5 F 14 Claims


FRIABILITY, % WEIGHT LOSS AFTER 10 MINUTES
(Foam Density Normalized to 2.0 lbs/ft³)
100
90
80
70
60
50
40
30
20
I
II
A 100 90 80 70 60 50 40 30 20 10 0 A
B 0 10 20 30 40 50 60 70 80 90 100 B
COMPOSITION OF BLOWING AGENT, WEIGHT PERCENT
(A = 1,1,2 - Trichloro -1,2,2 - Trifluoroethane, B = Methyl Formate)

1. A blend containing: (A) a phenolic resole, (B) methyl formate and (C) 1,1,2-trichloro-1,2,2-trifluoroethane, wherein the total combined weight of (B) and (C) is from about 2 to about 40 parts by weight per 100 parts by weight of (A) and, of the total combined weight of (B) and (C) contained in the blend, from about 5 to about 80 weight percent is methyl formate, provided the blend contains at least 0.4 and no more than about 20 parts by weight of methyl formate per 100 parts by weight of component (A).

4,033,911

PROCESS FOR CATALYZING POLYURETHANE FOAM FORMATION USING N,N-DIMETHYL-AMINOALKOXY-PROPIONITRILES

Michael Ray Sandner, Chappaqua, and Bela Prokai, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

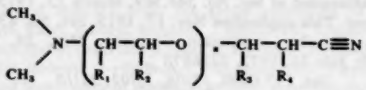
Filed June 24, 1976, Ser. No. 699,459

Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AC 37 Claims

1. A method for producing a cellular urethane polymer which comprises reacting and foaming a reaction mixture containing: (1) an organic polyol reactant comprising a polyether polyol having an average hydroxyl functionality of at least two; (2) an organic polyisocyanate reactant having an average isocyanate functionality of at least two; (3) a blowing agent; and (4) a catalytically effective amount of a catalyst

system comprising an N,N-dimethylaminoalkoxypropionitrile having the formula,



wherein:

R_1 and R_2 each represents hydrogen, methyl or ethyl provided R_1 and R_2 cumulatively have no more than 2 carbon atoms;

R_3 and R_4 each represents hydrogen, methyl or ethyl provided R_3 and R_4 cumulatively have no more than 2 carbon atoms; and

n has an average value of at least 1 and no more than about 5.

4,033,912
PROCESS FOR MOLDING POLYURETHANE FOAMS

Helmut Kleimann, and Wulf von Bonin, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 6, 1974, Ser. No. 521,426

Claims priority, application Germany, Nov. 13, 1973, 2356692

Int. Cl.² C08G 18/14, 18/77; C08K 5/54

U.S. Cl. 260—2.5 AH **11 Claims**

1. In a process for making molded polyurethane foams wherein a foamable reaction mixture is foamed in a closed mold, the improvement which comprises including in the foamable reaction mixture as an internal mold release agent a reaction product of an organic monoisocyanate or polyisocyanate and a polysiloxane which contains 1 to 6 $-CH_2-NH-(C_1$ to C_8 alkyl) or $-CH_2-NH-(C_3$ to C_8 cycloalkyl) groups in the molecule.

2. In a process for making molded polyurethane foams wherein a foamable reaction mixture is foamed in a closed mold, the improvement which comprises including in the foamable reaction mixture as an internal mold release agent a reaction product of an organic monoisocyanate or polyisocyanate and a polysiloxane represented by the general formula:

$$AR_2SiO-(R_2SiO)_nSiR_2A$$

in which

n represents 3 to 300

R represents i a methyl or phenyl groups, and

A represents $-CH_2-OH$ or $-CH_2-NH-(C_1$ to C_8 alkyl) or $-CH_2-NH-(C_3$ to C_8 cycloalkyl).

4,033,913
CELLULOSE AND CELLULOSE PRODUCTS MODIFIED BY SILICIC ACID

Olof Sundén, 22 Snickarvagen, S 181 46 Lidingo, Sweden

Filed May 16, 1975, Ser. No. 578,043

Int. Cl.² C08L 1/10

U.S. Cl. 260—17 R **15 Claims**

1. A composition comprising cellulose fibers, polysilicic acid, and a binder material, said cellulose fibers and polysilicic acid forming a cellulose polysilicic acid capillary structure having an internal capillarity corresponding to a BET-surface of 200–800 m^2/g polysilicic acid by absorbing a water based solution of monomer and oligomer silicic acids having a pH of between 1 and 5 into said cellulose fibers and polycondensating said monomer and oligomer silicic acids, and said binder material being adhered to said capillary structure.

4,033,914
WATER RESISTANT CORRUGATING ADHESIVE CONTAINING AMINOHYDROXY COMPOUND

Edward M. Bovier, and John E. Voigt, both of St. Louis County, Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed Feb. 23, 1976, Ser. No. 660,171

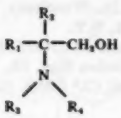
Int. Cl.² C08L 3/02

U.S. Cl. 260—17.2 **7 Claims**

1. A method of making a starch based adhesive comprising the steps of:

a. preparing an aqueous alkaline starch carrier containing a portion of the total starch solids,

b. mixing therein the remaining portion of the total starch solids, a resin selected from the group consisting of ketone-aldehyde, urea-formaldehyde, phenol-aldehyde, resorcinol-aldehyde, and mixtures thereof, and a primary, secondary or tertiary amine compound of the following formula:



wherein R_1, R_2, R_3, and R_4 are the same or different and are hydrogen, alkyl groups of 1 to 3 carbon atoms, or hydroxyalkyl groups of 1 to 3 carbon atoms, wherein the pH of the adhesive is about 10 to about 12.5.

4,033,915
FLAME-EXTINGUISHING POLYOLEFIN COMPOSITIONS

Guido Bertelli; Pierpaolo Roma, both of Ferrara, and Paolo Longi, Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed July 22, 1975, Ser. No. 598,123

Claims priority, application Italy, Aug. 2, 1974, 25928/74

Int. Cl.² C08K 5/56, 5/00

U.S. Cl. 260—28.5 A **6 Claims**

1. Self-extinguishing polyolefin compositions consisting of a mixture of:

A. 100 parts by weight of a homopolymer of ethylene or of an alpha-olefin, or a copolymer of ethylene and an alpha-olefin;

B. a flame-extinguishing agent which consists of the product obtained by reacting

1. a compound having the general formula MR_mX_n, in which M is bismuth; R is selected from the group consisting of alkyl, cycloalkyl, aryl and alkaryl having up to 20 carbon atoms, and the group $-OR^1$ wherein R^1 has a molecular weight of up to 400 and is selected from the group consisting of hydrocarbon groups and hydrocarbon groups containing ether oxygen atoms; X is chlorine or bromine; m and n are zero or integers from 1 to 5, the sum $m + n$ being equal to the valency of M, and

2. a compound selected from:

a. a saturated or unsaturated hydrocarbon polymer, or a saturated or unsaturated non-polymeric hydrocarbon having more than 6 carbon atoms; and

b. a polymeric or non-polymeric, partially halogenated, thermally unstable compound that decomposes when subjected to heating, resulting in the formation of the corresponding hydrogen halide;

said flame extinguishing agent being present in such amount as to provide a metal content in the polymer of (A) ranging from 0.5 to 5% by weight; and

C. 0 to 10 parts by weight of a partially chlorinated or brominated compound, said compound being thermally unstable and being capable of decomposing when sub-

jected to heating, resulting in the formation of hydrochloric or hydrobromic acid.

6. Self-extinguishing polymeric compositions made up of a mixture of:

A. predominantly isotatic polypropylene; and

B. a flame extinguishing agent, consisting of the product obtained by reacting bisumuth trichloride with a chlorinated paraffin wax containing 40 to 75% by weight of chlorine, said flame extinguishing agent being present in such an amount as to provide a bismuth content in the polymer of A of between 0.5 and 5% by weight.

4,033,916

TERNARY FLAME-RETARDED COMPOSITIONS INCLUDING IRON OXIDE

William Paul Whelan, Jr., Woodbury, Conn., assignor to Uniroyal Inc., New York, N.Y.

Continuation-in-part of Ser. No. 515,799, Oct. 17, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 612,147

Int. Cl.² C08K *3/22*

U.S. Cl. 260—28.5 A **13 Claims**

2. A composition comprising an organic polymer selected from the group consisting of acrylonitrile-butadiene rubber and a plastic terpolymer of acrylonitrile, butadiene and styrene, and: (a) from 1 to 110 parts by weight per 100 parts by weight of said organic polymer of a non-polymeric organic additive selected from the group consisting of chlorine-substituted and bromine-substituted aliphatic, aromatic and alicyclic hydrocarbyl compounds having a halogen content in the range of from 35 to 80 weight percent and optionally containing oxygen substituents in the form of hydroxyl or anhydride groups and which can alternatively be polymeric when said organic polymer is said plastic terpolymer and which are substantially non-volatile and stable at polymer processing temperatures, and mixtures thereof; and (b) from 0.1 to 50 parts by weight per 100 parts by weight of said organic polymer of an iron oxide selected from the group consisting of the anhydrous and hydrated forms of ferric oxide and ferrosoferric oxide and mixtures thereof.

9. The composition of claim 2 in which said organic additive is chlorine-containing paraffin wax.

4,033,917

ELECTRODEPOSITION OF AQUEOUS DISPERSIONS OF COPOLYMERS OF POLYETHYLENICALLY UNSATURATED EPOXY-AMINE ADDUCTS

Kazys Sekmakas, Chicago, and Raj Shah, Schaumburg, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed May 12, 1975, Ser. No. 576,714

Int. Cl.² G08K *3/18*; **C08L** *61/20*

U.S. Cl. 260—29.2 N **17 Claims**

1. A nongelled, amine-functional polymer dispersible in water with the aid of a solubilizing acid, said polymer being a copolymer of:

A. an ethylenically unsaturated hydroxy functional amine adduct free of epoxy groups and containing from about 1.4 to about 2.0 ethylenically unsaturated amine groups per molecule, formed from a polyepoxide having a 1,2-epoxy equivalency of from about 1.4 to about 2.0 and at least a stoichiometric amount of an ethylenically unsaturated primary monoamine; and

B. copolymerizable monoethylenically unsaturated monomers, a portion of which is amine-functional.

4,033,918

WATER REMOVABLE PRESSURE SENSITIVE ADHESIVE

Rüdiger Hauber, Hamburg, Germany, assignor to Beiersdorf Aktiengesellschaft, Hamburg, Germany

Continuation of Ser. No. 344,309, March 23, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,624

Claims priority, application Germany, Mar. 24, 1972, 2214293; July 26, 1972, 2236575

Int. Cl.² C08L *33/08*, *33/02*, *33/10*

U.S. Cl. 260—29.6 WB **7 Claims**

1. An adhesive composition which comprises an aqueous mixture containing, based on 100 parts weight of the total solids,

a. 25 to 35 parts by weight of an acrylic acid ester copolymer in dispersed form, said copolymer being cross-linked through its carboxyl groups and containing from 80 to 90% by weight of an acrylic acid ester of an alcohol having 4–12 carbon atoms, and from 10 to 20% by weight of a compound selected from the group consisting of acrylic acid, methacrylic acid, acrylonitrile, vinyl acetate, 2-ethyl hexyl maleinate, diethyl maleinate and mixtures thereof;

10 to 20 parts by weight of an uncross-linked acrylic acid ester copolymer in dispersed form, said copolymer contains from 80 to 90% by weight of an acrylic acid ester having in its alcohol residue 4–12 carbon atoms, and from 10 to 20% by weight of a compound selected from the group consisting of acrylic acid, methacrylic acid, acrylonitrile, vinyl acetate, 2-ethyl hexyl maleinate, diethyl maleinate and mixtures thereof;

b. 10 to 20 parts by weight of polyvinylmethyl ether;

c. 10 to 20 parts by weight of an alkali metal and/or ammonium salt of polyacrylic acid, polymethacrylic acid or of a copolymer of acrylic and methacrylic acids;

d. 10 to 20 parts by weight of monomeric plasticizer, and

e. 10 to 15 parts by weight of an emulsifying agent.

4,033,919

DESENSITIZING COMPOSITIONS FOR LITHOGRAPHIC PLATEMAKING AND PRINTING WHICH ARE AQUEOUS SOLUTIONS OF COPOLYMERS OF ACRYLAMIDE WITH A CARBOXYL CONTAINING MONOMER AND A DESENSITIZING ACIDIC ADDITIVE

Leslie Edward Lawson, Orpington, England, assignor to Vickers Limited, London, England

Filed Jan. 31, 1975, Ser. No. 546,098

Claims priority, application United Kingdom, Feb. 4, 1974, 5099/74

Int. Cl.² C08L *33/26*

U.S. Cl. 260—29.6 TA **9 Claims**

1. A desensitising composition for use in lithographic plate making and lithographic printing which composition is an aqueous solution comprising (i) a polymer of acrylamide containing from 1% by weight to 25% by weight of structural units containing carboxyl groups and (ii) acidic desensitising material in an amount such that the pH of the solution is less than 5.5.

4,033,920

PROCESS FOR PRODUCING UNSATURATED RESIN EMULSION

Osamu Isozaki; Tadashi Watanabe, and Masahiro Sakamoto, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan

Filed June 10, 1975, Ser. No. 585,770

Claims priority, application Japan, June 14, 1974, 49-67698; July 1, 1974, 49-75166

Int. Cl.² C08L *33/02*

U.S. Cl. 260—29.6 H **8 Claims**

1. A process for producing an aqueous emulsion of unsaturated resin which comprises the steps of: synthesizing polyvinyl resin having an acid value of 50 to 230 and a number

average molecular weight of 10,000 to 200,000 by means of solution copolymerization of at least one acid monomer selected from the group consisting of acrylic acid, methacrylic acid, orthophosphoric acid monoacrylate ester and orthophosphoric acid monomethacrylate ester with at least one compound selected from the group consisting of styrene; methyl, ethyl, n-butyl, isobutyl, 2-ethylhexyl, 2-hydroxyethyl, 2-hyroxypropyl and lauryl ester of acrylic acid; methyl, ethyl, n-butyl, isobutyl, 2-ethylhexyl, 2-hydroxyethyl, 2-hydroxypropyl and lauryl ester of methacrylic acid; acrylonitrile; methacrylonitrile; acrylamide; methacrylamide; N-methylol acrylamide; N-methylol methacrylamide; diacetone acrylamide; and diacetone methacrylamide; adding at least one monomer having epoxy group and reactive unsaturated group selected from the group consisting of glycidyl acrylate, glycidyl methacrylate and allylglycidyl ether to said polyvinyl resin to produce unsaturated resin having an acid value of 20 to 60 and an unsaturation degree of 0.5 to 3.0, removing the polymerization solvent under reduced pressure, neutralizing residual acid groups with 0.4 to 1.2 equivalent of base and dispersing the neutralized product into water.

4,033,921
WATER-SOLUBLE HYDROXYALKYLATED AND ALKOXYALKYLATED COMPOSITIONS DERIVED FROM N-3-OXO-HYDROCARBON-SUBSTITUTED ACRYLAMIDES

Lester Earl Coleman, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

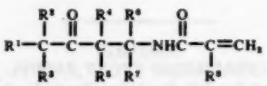
Division of Ser. No. 533,361, Dec. 16, 1974, Pat. No. 3,959,224, which is a continuation-in-part of Ser. No. 111,676, Dec. 1, 1971, abandoned, which is a continuation-in-part of Ser. No. 833,162, June 13, 1969, abandoned, which is a continuation-in-part of Ser. No. 751,715, Aug. 12, 1968, abandoned. This application Aug. 25, 1975, Ser. No. 607,847

Int. Cl.² C08L *29/12, 35/00*

U.S. Cl. 260—29.6 H **7 Claims**

1. An aqueous latex of an addition interpolymer of at least one polymerizable unsaturated monomer with a polymerizable water-soluble composition consisting essentially of:

A. compounds of the formula



wherein each of R^1, R^2, R^3, R^4 and R^5 is hydrogen, a hydrocarbon or substituted hydrocarbon radical, a hydroxyalkyl radical having not more than 4 carbon atoms, or an alkoxy derivative of said hydroxyalkyl radical, at least one of R^1, R_2, R^3, R^4 and R^5 being a hydroxyalkyl radical or alkoxy derivative thereof; each of R^6 and R^7 is hydrogen or a hydrocarbon or substituted hydrocarbon radical; and R^8 is hydrogen, halogen or a lower alkyl radical; with the proviso that the substituents on said substituted radicals do not alter significantly the character or reactivity of said radicals; and

B. condensation dimers and trimers of said compounds.

4,033,922
SYNTHETIC SIZES

Joseph J. Baron, Jr., Morris Plains, and Sherman Krefting, Teaneck, both of N.J., assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Division of Ser. No. 481,214, June 20, 1974, Pat. No. 3,974,326. This application Mar. 30, 1976, Ser. No. 671,967

Int. Cl.² C08F *220/06*

U.S. Cl. 260—29.6 RW **3 Claims**

1. A synthetic size for use on yarn in a water jet loom comprising an aqueous solution of a copolymer comprising from about 97% to about 85% by weight of methacrylic acid and from about 3% to about 15% by weight of a comonomer selected from the group consisting of acrylic acid and vinylethoxytetraethylene glycol.

4,033,923
COLORING RESINS BY MIXING NAPHTHACENEQUINONES THEREWITH

Michihiro Tsujimoto, Tachikawa; Ryoichi Tsukahara, Yokohama; Tsutomu Nishizawa, Kamakura, and Ichiro Okubo, Hachioji, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

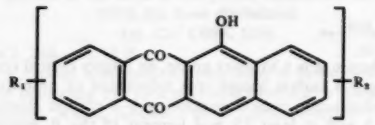
Division of Ser. No. 544,820, Jan. 28, 1975, Pat. No. 3,986,826. This application Feb. 4, 1976, Ser. No. 655,011

Claims priority, application Japan, Feb. 7, 1974, 49-14892

Int. Cl.² C08L *77/02, 61/20, 67/00*

U.S. Cl. 260—37 N **10 Claims**

1. A method for coloring a synthetic or semisynthetic organic resin comprising mixing said resin with a naphthacenequinone derivative having the formula:



wherein R_1 is selected from the group consisting of hydrogen, chlorine, hydroxyl and amino; and R_2 is selected from the group consisting of

i. -13 $COOR_4$ wherein R_4 is a member selected from the group consisting of hydrogen, alkyl, alkoxyalkyl, cyclohexyl, aralkyl and cations;

ii.

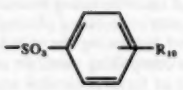
wherein R_5 and R_6 are members selected from the group consisting of hydrogen, alkyl and aryl;

iii. $-CONH-R_7$ wherein R_7 is amino;

iv.

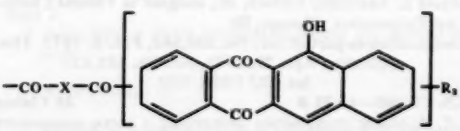
wherein R_8 and R_9 are hydrogen, alkyl, alkoxyalkyl, and aryl;

v.



wherein R_{10} is a member selected from the group consisting of methyl or chlorine;

vi. $-SO_3-R_{11}$ wherein R_{11} is a cation; and



substituted at an optional position and wherein X is hydrazo or aromatic diamino and R_3 is optionally positioned and is selected from the group consisting of hydrogen, chlorine, hydroxyl and amino.

4,033,924

HEAT CURABLE ORGANOPOLYSILOXANE COMPOSITIONS CONTAINING ADHESION ADDITIVES

Katsutoshi Mine, Ichihara; Minoru Nishio, Chiba, and Shinichi Sumimura, Ichihara, all of Japan, assignors to Toray Silicone Company, Ltd., Ichihara, Japan

Filed Oct. 26, 1976, Ser. No. 735,721

Claims priority, application Japan, Dec. 15, 1975, 50-148443

Int. Cl.² C08L *83/04*

U.S. Cl. 260—37 SB **2 Claims**

1. A heat curable organopolysiloxane composition which consists of

1. 100 parts by weight of an organopolysiloxane having the general formula

$$R_aSiO_{\frac{4-a}{2}}$$

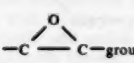
wherein R is a hydroxy group, an alkoxy radical containing 1–4 carbon atoms or a substituted or unsubstituted hydrocarbon radical containing 1–8 carbon atoms, *a* is 1–3 and at least 25 mol percent of the R groups are monovalent unsubstituted hydrocarbon groups,

2. 0–400 parts by weight of particulate of fibrous filler,

3. 0.01–10 part by weight of an organic peroxide catalyst and,

4. 0.01–20 parts by weight of an organosilicon compound having

i. at least one $A(R'O)_2Si$— group attached thereto wherein A is a monovalent hydrocarbon group containing at least one



R' is a low molecular weight alkyl group, and

ii. at least one alkyl group containing 1–4 carbon atoms or

iii. at least one low molecular weight alkenyl group or hydrogen atom bound to silicon.

4,033,925

MONOMERIC FURFURYL ALCOHOL-RESORCINOL FOUNDRY BINDERS

Hugh C. Anderson, Palatine, Ill., assignor to The Quaker Oats Company, Chicago, Ill.

Filed July 12, 1976, Ser. No. 704,329

Int. Cl.² C08K *3/36*

U.S. Cl. 260—42.53 **10 Claims**

1. The method of manufacturing foundry sand shapes for use as cores and molds comprising placing a sand mix in the shaping element and hardening the mix in the shaping element, the sand mix comprising sand, an acid catalyst, and a monomeric mixture of furfuryl alcohol and resorcinol, comprising 2–45 percent resorcinol.

4,033,926

FLAME RETARDANT EPOXY RESIN COMPOSITIONS

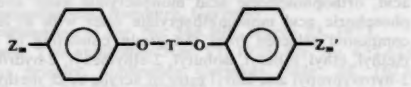
Arnold L. Anderson, Antioch, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 330,843, Feb. 8, 1973. This application Apr. 29, 1976, Ser. No. 681,432

Int. Cl.² C08K *5/06*

U.S. Cl. 260—45.75 B **26 Claims**

1. A plastic composition comprising a three component system consisting of (1) an epoxy resin polymer, (2) a bisphenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (a) Z is bromine; (b) *m* and *m'* are independent and are integers having a value of from 1 to 5 with the proviso that the bromine atom content is from 6 to 10 bromine atoms; and (c) T is a straight or branched chain carbon group having from one to four carbon atoms, and (3) a flame retardant enhancing agent.

4,033,927

FLAME RETARDANT POLYESTER RESIN COMPOSITIONS

Willem F. H. Borman, Pittsfield, Mass., assignor to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 194,519, Nov. 1, 1971, abandoned. This application Jan. 15, 1975, Ser. No. 541,344

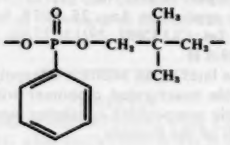
Int. Cl.² C08K *5/53*

U.S. Cl. 260—45.7 P **1 Claim**

1. A flame retardant thermoplastic composition comprising:

a. a normally flammable high-molecular weight poly(1,4-butylene terephthalate) resin and;

b. as a flame retardant additive, the reaction product of neopentyl glycol and phenyl phosphonic dichloride, said reaction product being a single unit or being 2 to 50 repeating units of the formula;



4,033,928

STABILIZED EPOXY RESINS

Donald Richard Randell, Stockport; Barry Cook, Manchester, and Alexander Michael Chalmers, Cheadle, all of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

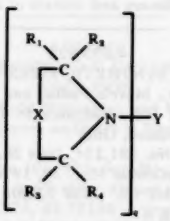
Filed Apr. 1, 1975, Ser. No. 564,185

Claims priority, application United Kingdom, Apr. 11, 1974, 16127/74

Int. Cl.² C08K *5/00*

U.S. Cl. 260—45.8 N **9 Claims**

1. A method of stabilizing an epoxy resin by incorporating therein as a stabilizer substantially only at least one sterically hindered cyclic amine of the formula



and salts thereof, wherein *q* is 1 or 2, *X* represents an organic grouping which complements the nitrogen-containing ring to give 5-membered, 6-membered or 7-membered ring, R_1 and

R_2 represent methyl or together represent $-(CH_2)_6-$, R_3 represents methyl, R_4 represents alkyl with 1–5 carbon atoms or together with R_3 represents the radicals $-(CH_2)_4-$, $-(CH_2)5-$, $-CH_2-C(CH_3)_2-NH-C(CH_3)_2-CH_2-$or $-CH_2-C(CH_3)_2-N(O\cdot)-C(CH_3)_2-CH_2-$and, if q is 1, Y denotes hydrogen,—O·, hydroxyl, alkyl, substituted alkyl, alkenyl, alkynyl, aralkyl, substituted aralkyl or acyl or, if q is 2, Y denotes alkylene, alkenylene, alkynylene, cycloaklylene or aralkylene.

4,033,929
PLASTIC SKIN ENVELOPES FOR GLASS BOTTLES AND THE LIKE

Claude J. Stiles, Tuscola, and Daniel Tomo, Arthur, both of Ill., assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Jan. 14, 1974, Ser. No. 433,169

Int. Cl.² B29C *27/20;* **B29D** *27/00;* **B65D** *11/16*

U.S. Cl. 264—45.9 **9 Claims**

1. A method of producing a seamless lightweight, strong, uniform, multi-ply, oriented foamed layer tubular laminate preform with good opacity adapted to be heat-shrunk onto a tubular substrate rapidly and uniformly, which comprises co-extruding through coaxial annular dies a first and second plastic material, said first plastic material comprising a low density polyethylene and said second plastic comprising an intimate mixture of an ethylene polymer and 0.1%–2% of a blowing agent having a decomposition range above the softening point of the ethylene polymer and below the decomposition temperature of the ethylene polymer, drawing down the resultant tubular foamed laminate at a speed of about 10–25 feet/minute; inflating said tubular foamed laminate wherein the blow-up ratio is about 1:1 to 3:1 such that shrinkage in the machine direction upon application of heat to the resulting laminate will be about 70%–90% and shrinkage in the transverse direction will be about 5%–15% ; cooling said foamed tubular laminate and cutting said laminate to length to form said tubular preform and wherein the non-foamed ply of said final laminated perform is about 10%–20% of the thickness thereof.

4,033,930
FLAME RETARDANT POLYCARBONATE COMPOSITION

Victor Mark, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.

Continuation-in-part of Ser. No. 429,121, Dec. 28, 1973, Pat. No. 3,948,851. This application Mar. 26, 1976, Ser. No. 670,679

Int. Cl.² C08K *5/16*

U.S. Cl. 260—45.9 R **10 Claims**

1. A flame retardant aromatic carbonate polymer composition comprising in admixture an aromatic carbonate polymer and a minor amount of a metal salt of a mixture of a monomeric and polymeric aromatic sulfonesulfonate or a metal salt of a polymeric aromatic sulfonesulfonate wherein said metal salts are selected from the group consisting of the alkali metal salts and the alkaline earth metal salts and mixtures thereof.

4,033,931
PLASTIC COMPOSITIONS

Arnold L. Anderson, Alma, Mich., assignor to Velsicol Chemical Corporation, Chicago, Ill.

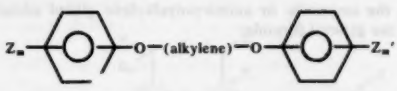
Filed Feb. 8, 1973, Ser. No. 330,841

The portion of the term of this patent subsequent to July 5, 1994, has been disclaimed.

Int. Cl.² C08L *69/00*

U.S. Cl. 260—45.75 R **15 Claims**

1. A plastic composition comprising a polycarbonate and a flame retardant, said flame retardant consisting of a compound having the formula



wherein (a) Z is bromine; (b) m and m' are independent and are integers having a value of from 1 to 5; and (c) alkylene is a straight or branched chain alkylene group having from one to six carbon atoms.

4,033,932
PLASTIC COMPOSITIONS

Arnold L. Anderson, Antioch, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

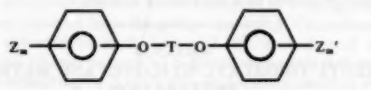
Continuation-in-part of Ser. No. 330,841, Feb. 8, 1973. This application Feb. 9, 1976, Ser. No. 656,224

The portion of the term of this patent subsequent to July 5, 1994, has been disclaimed.

Int. Cl.² C08K *5/06*

U.S. Cl. 260—45.75 B **29 Claims**

1. A plastic composition comprising a three component system consisting of (1) a polycarbonate, (2) a bis-phenoxy compound, which functions as a flame retardant for said composition, having the formula



wherein (*a*) Z is bromine; (*b*) m and m' are independent and are integers having a value of from 1 to 5 with the proviso that the bromine atom content is from 6 to 10 bromin atoms; and (*c*) T is a straight or branched chain carbon group having from one to four carbon atoms, and (3) a flame retardant enhancing agent.

4,033,933
RUBBER COMPOSITIONS AND METHODS FOR PRODUCTION THEREOF STABILIZED

Akira Shimizu; Manabu Kusano, and Takeshi Takami, all of Ibaragi, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Oct. 28, 1975, Ser. No. 626,603

Claims priority, application Japan, Oct. 31, 1974, 49-125793

Int. Cl.² C08K *5/17, 5/10, 5/06*

U.S. Cl. 260—45.85 R **10 Claims**

1. A rubber composition comprising (A) a synthetic cis-1,4-polyisoprene rubber stock and (B) from 0.005 to 5 parts by weight per 100 parts by weight of said rubber stock of a high molecular weight alkylene oxide selected from the group consisting of:

1. polyalkylene glycols and polyalkylene glycol monoalkyl ethers having the general formula:

$$RO(C_xH_{2x}O)_aH \quad (I)$$

wherein R is hydrogen or an alkyl radical containing 1 to 20 carbon atoms; x and a, respectively, represent numbers of at least 2;

2. polyalkylene glycol monoesters having the general formula:

$$RCOO(C_xH_{2x}O)_aH \quad (II)$$

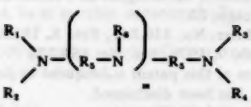
wherein R is an alkyl radical containing 1 to 20 carbon atoms; x and a, respectively, represent numbers of at least 2;

3. the ammonia- or amine-polyalkylene glycol adducts of the general formula:

(III)

wherein at least one of R_1, R_2 and R_3 is $(C_xH_{2x}O)_aH$, and the others can be hydrogen or an alkyl radical containing 1 to 20 carbon atoms; x and a, respectively, represent a number of at least 2; and

4. the alkylene polyamine-polyalkylene glycol adducts having the general formula:



(IV)

wherein at least one of R_1, R_2, R_3 and R_4 is $(C_xH_{2x}O)_aH$ and the others can be hydrogen or an alkyl radical containing 1 to 20 carbon atoms; R_5 is an alkylene radical containing 1 to 6 carbon atoms; R_6 is hydrogen, an alkyl radical containing 1 to 20 carbon atoms or $(C_xH_{2x}O)_aH$; x and a, respectively, represent a number of at least 2; and m is zero or a number of at least 1.

4,033,934

ALKENYL THIOALKYL SILICONES AND METHOD OF PREPARATION

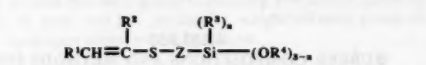
Abe Berger, Schenectady, N.Y., assignor to Abe Berger; Gerhard K. Adam, both of Schenectady, N.Y. and John Stonkus, Dover, N.J.

Filed Feb. 27, 1976, Ser. No. 662,149

Int. Cl.² C08G 77/04

U.S. Cl. 260—46.5 G **20 Claims**

1. A silicone compound having alkylenethio functional groups and represented by the formula:



wherein R^1 and R^2 are lower alkyl, phenyl or hydrogen; R^3 is lower alkyl, phenyl or phenylalkyl; R^4 is alkyl containing up to 15 carbon atoms, phenyl or phenylalkyl; Z is a bivalent organic radical selected from the group consisting of alkylene having 1–18 carbon atoms, phenylene, a radical having the structure: $—R^5—Y—R^6—$ wherein Y is oxygen or sulfur, R^5 is lower alkylene or phenylene, R^6 is lower alkylene or phenylene and n is an integer having the value of 0–2.

4,033,935

PROCESS FOR THE PRODUCTION OF AMINO SILICATE COMPOUNDS AND THEIR CONDENSATION PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 559,313, March 17, 1975, Pat. No. 3,979,362, which is a continuation-in-part of Ser. No. 71,628, Sept. 11, 1970, abandoned. This application Jan. 26, 1976, Ser. No. 652,338

Int. Cl.² C08G 12/26; C08K 3/34

U.S. Cl. 260—67.6 R **12 Claims**

1. The process for the production of poly(aldehyde amino silicate) resinous condensation products by the following steps:

a. mixing about 10 parts by weight of silicic acid, weight calculated on the basic of dried silicic acid, and from about 5 to 20 parts by weight of an amino compound;

b. heating said mixture to a temperature of from about 70° C to above the melting point, but below the boiling point of the amino compound for at least 20 minutes; whereby an amino silicate compound is formed:

c. adding an aldehyde to said mixture in the ratio of 1 to 5 mols to each mol of said amino silicate, heating said mixture to a temperature of from about 70° to 150° C., while agitating, for at least about 20 minutes, whereby a poly(aldehyde amino silicate) resin is produced.

4,033,936

PROCESS FOR THE MANUFACTURE OF FLAME RETARDING LINEAR POLYESTERS

Ulrich Bollert, Hofheim, Taunus; Elmar Lohmar, Rodenkirchen, and Alexander Ohorodnik, Erfstadt, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

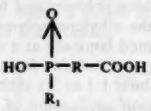
Filed Nov. 17, 1975, Ser. No. 632,782

Claims priority, application Germany, Nov. 15, 1974, 2454189

Int. Cl.² C08G 63/20, 63/68

U.S. Cl. 260—75 P **4 Claims**

1. In a process for the manufacture os flame retarding linear polyesters by reaction of a dicarboxylic acid capable of forming high molecular weight linear polyesters or an ester of said dicarboxylic acid with a lower aliphatic alcohol, with a diol reactant and a phosphorus compound of the formula



where

R is a saturated open-chain or cyclic alkylene, an arylene or an aralkylene radical and

R_1 is an alkyl radical having up to 6 carbon atoms, an aryl or aralkyl radical; and R as well as R_1 may contain one or more hetero atoms selected from the group consisting of F, Cl, Br, O, and S, the improvement which comprises employing a cyclic anhydride of the above phosphorus compounds, dissolving said anhydride at elevated temperature in a diol solvent suitable for the polyester manufacture to form a carboxy phosphinic acid semi-ester of said diol solvent and reacting said semi-ester with said dicarboxylic acid and said diol reactant to form said polyester.

4,033,937

POLYISOCYANURATE SALT EMULSIFYING AGENTS AND DERIVATIVES

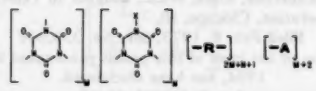
Perry A. Argabright, Larkspur; C. Travis Presley, Littleton, and Charles B. Wenger, Denver, all of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Feb. 9, 1972, Ser. No. 224,905

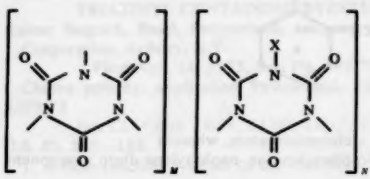
The portion of the term of this patent subsequent to Dec. 18, 1990, has been disclaimed.

Int. Cl.² C08G 18/00

U.S. Cl. 260—77.5 NC **7 Claims**



1. A composition comprising a mixture of compounds containing in a single molecule isocyanurate and metal isocyanurate, and having the structure:



$[-R-]_{2M+N+1}\ [-A]_{M+2}$

wherein:

R = divalent hydrocarbon or substituted hydrocarbon radical, containing 2 to about 40 carbon atoms,

X is selected from the group consisting of metals, or quarternary ammonium radials,

A is a monovalent organic radical selected from the group consisting of $-NHCO_2R'$, $-NHCONHR'$, $-NH_2$, $-NHR'$, and $-NR'_2$ wherein R′ is a monvalent radical or substituted hydrocarbon radical containing from 1 to about 40 carbon atoms,

M is the average number of trisubstituted isocyanurate rings per molecule and is a positive integer from zero to about 400

$2M+N+1$ = the average number of divalent R groups and is a positive integer from 2 to about 11,000, and wherein

$M+2$ is the average number of A groups and is a positive integer from 2 to about 2,000, and wherein there are no N—to—N bonds, no A—to—N bonds, no A—to—A bonds, and no R—to—R bonds,

N is the average number of isocyanurate salt groups and is a positive integer from 1 to about 10,000, are useful emulsifying agents.

4,033,938

POLYMERS OF UNSYMMETRICALLY SUBSTITUTED 1,4-DIOXANE-2,5-DIONES

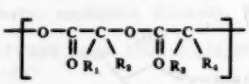
Thomas Anthony Augurt, Stamford, Conn.; Michael Norman Rosensaft, Monsey, and Vincent Anthony Perciaccante, Long Island, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 435,365, Jan. 21, 1974, abandoned. This application Mar. 14, 1975, Ser. No. 558,527

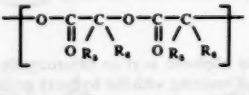
Int. Cl.[3] C08G *63/08*

U.S. Cl. 260—78.3 R **5 Claims**

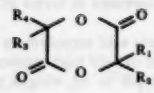
1. A method of forming a polymer containing more than 2% by weight of recurring units of the formula:



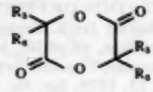
and the remaining units are



where R_1 and R_2 are not the same as R_3 and R_4, R_1 has at least one carbon atom, and R_1, R_2, R_3, R_4, R_5, and R_6, are separately selected from the group consisting of hydrogen and the radicals methyl, ethyl, propyl, isopropyl, butyl, isobutyl, cyclohexyl, and phenyl which comprises heating, in the presence of a catalyst, at least 2% by weight of an unsymmetrically substituted 1,4-dioxane-2,5-dione of the formula:



where R_1, R_2, R_3 and R_4 are defined as above and at least one compound of the formula:



where R_5 and R_6 are defined as above.

4,033,939

STRESS-CRACK RESISTANT ETHYLENE-PERHALOETHYLENE TERPOLYMERS

Stephen R. Schulze, Gillette, N.J., assignor to Allied Chemical Corporation, Morris Township, N.J.

Continuation-in-part of Ser. No. 564,232, April 2, 1975. This application Jan. 19, 1976, Ser. No. 649,936

Int. Cl.[2] C08F *214/04, 214/26;* **C08L** *23/08*

U.S. Cl. 260—878 R **23 Claims**

1. Terpolymers of from about 40 to 60 mol percent ethylene, from about 60 to about 40 mol percent of a halogenated comonomer selected from the group consisting of tetrafluoroethylene, chlorotrifluoroethylene and mixtures thereof and about 0.1 to 10 mol percent of a termonomer selected from the group consisting of 3,3,3-trifluoro-2-trifluoromethyl propene, a vinyl monomer selected from the group consisting of fluorinated alpha-monoolefins, and monomers of the formula R —$CF{=}CF_2$; $ROCF{=}CF_2$; $CF_2(CF_2)_mCH_2OCF{=}CF_2$; $CH_2(CH_2)_nOCF{=}CF_2$; $R'CH_2(X){=}CH_2$ and $R_3OCH_2C(X){=}CH_2$, wherein R is an organic group containing 2 to 8 carbon atoms, R′ is a perfluorinated or chlorofluoroalkyl group of 1 to 7 carbon atoms or a secondary or tertiary halo-alcohol group, R_2 is a perfluorinated or chlorofluoroalkyl of 1 to 7 carbon atoms, X is H or CH_3, m is an integer of 0 to 6 and n is an integer of 1 to 7, and mixtures thereof, and containing high and low molecular weight components of said terpolymers such that equations (1) and (2) are satisfied:

$$(1)\ \sum_{i=1}^{\infty} X_i\overline{M}w_i = f \cdot \overline{M}w, \text{ and}$$

$$(2)\ 0.02 \leq \frac{\overline{M}w \sum_{i=1}^{\infty} X_i}{\sum_{i=1}^{\infty} X_i\overline{M}w_i} \leq 0.6$$

wherein

X_i represents the weight fraction of each high molecular weight component,

$\overline{M}w$ represents the weight-average molecular weight of the terpolymer,

$\overline{M}w_i$ represents the weight-average molecular weight of each component i,

$$\overline{M}w = \sum_{i=1}^{\infty} X_i\overline{M}w_i + \sum_{j=1}^{\infty} X_j\overline{M}w_j,$$

wherein

X_j represents the weight fraction of each low molecular weight component,

$\overline{M}w_j$ represents the weight-average molecular weight of each component j, and

$0.1 \leq f \leq 0.95$, the high molecular components having a weight-average molecular weight, expressed in terms of melt index of from about 0.0001 to 1.0 and the low mo-

lecular weight components having a weight-average molecular weight, expressed in terms of melt index of from about 3 to 3000

and therefore wherein said terpolymers contain from 0.2 to 57 weight percent of said high molecular weight components and from 99.8 to 43 weight percent of said low molecular weight components.

4,033,940

CYCLIZATION OF PEPTIDES

John L. Hughes, Kankakee; Jay K. Seyler, Bourbonnais, and Robert C. Liu, Kankakee, all of Ill., assignors to Armour Pharmaceutical Company, Phoenix, Ariz.

Filed Nov. 12, 1975, Ser. No. 631,408
Int. Cl.² C07C *103/52*
U.S. Cl. 260—112.5 S 21 Claims

1. In a process for preparing a peptide having a disulfide ring structure, the step of holding a peptide which contains an amino terminal cystine residue and a cysteine residue located in a position within the amino acid sequence in a solution substantially free of oxygen until rearrangement has taken place to yield a cyclic disulfide peptide.

4,033,941

PROCESS FOR PURIFYING GLUCAGON

John G. Stilz, and Richard L. Jackson, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 17, 1975, Ser. No. 641,419
Int. Cl.² C07C *103/52*
U.S. Cl. 260—112.5 R 12 Claims

1. A process for purifying glucagon which comprises the steps of

A. swelling a gel having in the dry state a water regain of at least about 4 percent by weight and particle diameters smaller than about 100 microns;

B. packing a column with the swollen gel;

C. adding to the packed column an aqueous solution, having a pH of from about 9 to about 11, of glucagon having a purity of at least about 0.1 percent, wherein such glucagon solution contains at least about 0.01 miligrams of glucagon per mililiter of solution and less than about 10 percent, weight per volume, total protein solids, and the total amount of glucagon added to the column is sufficient to provide a column loading of from about 0.01 to about 5 g per liter of bed volume; and

D. eluting the glucagon from the column at a temperature from about 4 to about 40° C., with an aqueous eluant having a pH within same range as that of the glucagon solution.

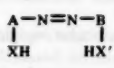
4,033,942

CHROMIUM COMPLEX DYE, INCLUDING AZO AND AZO METHINE DYE COMPOUNDS

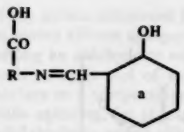
Fabio Beffa, Riehen, Switzerland; Gerhard Back, Lorrach, Germany, and Eginhard Steiner, Fullinsdorf, Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Apr. 27, 1976, Ser. No. 680,640
Claims priority, application Switzerland, May 14, 1975, 6193/75
Int. Cl.² C09B *45/26*, *45/06*
U.S. Cl. 260—145 A 21 Claims

1. A 1:2 chromium complex dye containing one molecule of a non-heterocyclic azo compound of the formula



and one molecule of a non-heterocyclic azomethine compound of the formula



complexed to a chromium atom, wherein

A is an ortho-phenylene or -naphthylene diazo component radical;

B is an ortho-phenylene or -naphthylene coupling component radical;

X is —O— or —CO—O—;

X′ is —O—, —NH—, —N(lower alkyl)—, —N(aralkyl)— or —N(aryl)—;

R is a substituted or unsubstituted aliphatic radical;

the benzene ring *a* is unsubstituted or substituted by a fused benzene ring, halo, nitro, alkyl or alkoxy,

and wherein said compounds contain together 0 to 5 water-solubilizing groups, 0 to 1 group of the formula

—N=N—Ar—N=N—Ar′

and 0 to 2 groups of the formula —N=N—Ar″

wherein

Ar, Ar′ and Ar″ each represent an aromatic or carbocyclic radical.

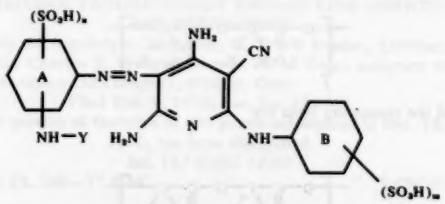
4,033,943

FIBER REACTIVE WATER SOLUBLE 2,4,6-TRIAMINO, 3-CYANO PYRIDINE-(5) AZO DYESTUFFS

Visvanathan Ramanathan; Angelo Della Casa, both of Basel; Rene de Montmollin, Riehen; Gert Hegar, Schonenbuch, and Hans Ulrich Schutz, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 21, 1975, Ser. No. 551,794
Claims priority, application Switzerland, Feb. 26, 1974, 2689/74
Int. Cl.² C09B *29/36*, *43/12*, *43/16*
U.S. Cl. 260—153 7 Claims

1. A water-soluble azo dye of the formula



wherein Y is an aliphatic acyl or heterocyclic fiber-reactive group capable of reacting with the hydroxy groups of cellulose or with the amino groups of polyamides to form a covalent chemical bond therewith; *n* is 1 or 2; *m* is 0, 1 or 2; the benzene ring A is further unsubstituted or substituted by halo, lower alkyl, lower alkoxy, nitro or carboxy; and the benzene ring B is further unsubstituted or substituted by lower alkyl, lower alkoxy, nitro, carboxy, or is -NHY wherein Y is independently as defined above.

4,033,944

FIBRE-REACTIVE HYDROXYCYCLOALKENYL-HALO TRIAZINYL CONTAINING DYESTUFFS

Rainer Begrich, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

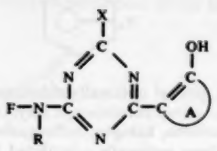
Filed Apr. 14, 1975, Ser. No. 567,796

Claims priority, application Switzerland, Apr. 18, 1974, 5359/74

Int. Cl.² C09B 29/36, 31/00, 43/12, 45/48

U.S. Cl. 260—153 5 Claims

1. A fiber-reactive dyestuff of the formula



wherein

is an amino substituted azo dyestuff radical;

R is hydrogen, lower alkyl, cyclohexyl or phenyl;

and the ring A is cyclopentenyl, cyclohexenyl or cycloheptenyl.

4,033,945

WATER-SOLUBLE TRISAZO 8-AMINO-NAPHTHOL-1 DYES

Wolfgang Bauer, Maintal; Erwin Krusche, Frankfurt am Main, and Joachim Ribka, Offenbach am Main-Burgel, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

Filed May 20, 1975, Ser. No. 579,156

Claims priority, application Germany, May 20, 1974, 2424462

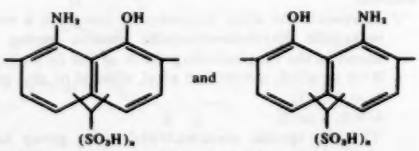
Int. Cl.² C09B 31/16, 33/18, 35/36; D06P 1/06

U.S. Cl. 260—157 20 Claims

1. A water-soluble dye having the formula

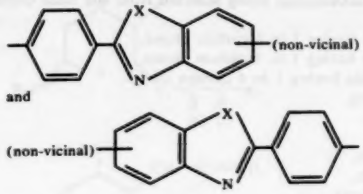
A-N=N-A¹-N=N-A²-N=N-A³

where A¹ is selected from the class consisting of



n being 1 or 2,

A² is selected from the class consisting of



X being

—S—, or —O—and

R being hydrogen or lower hydrocarbyl free of non-aromatic unsaturation,

A is a radical of a diazo component, and

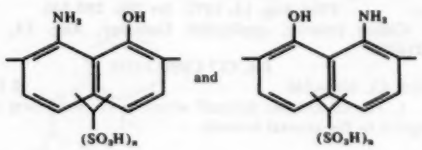
A³ is a radical of a coupling component,

each of A and A³ having a carbon-containing aromatic ring connected by such carbon to the azo linkages.

7. A water-soluble dye having the formula

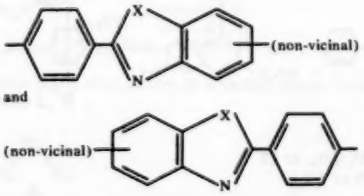
A-N=N-A¹-N=N-A²-N=N-A³

where A¹ is selected from the class consisting of



n being 1 or 2,

A² is selected from the class consisting of



X being

—S—, or —O—, and

R being hydrogen or lower hydrocarbyl free of non-aromatic unsaturation,

A is selected from the class consisting of unsubstituted or substituted phenyl, naphthyl and dehydrothiotoluidinyl, the substitution being selected from the class consisting of:

alky having 1 to 4 carbon atoms,
alkoxy having 1 to 4 carbon atoms,
alkylthio having 1 to 4 carbon atoms,
hydroxy,
cyano,

nitro,
sulfo,
carboxy,
chloro,
bromo,
alkoxycarbonyl having 1 to 4 carbon atoms in the alkoxy radical,
alkylcarbonyl having 2 to 5 carbon atoms,
aminocarbonyl,
alkylaminocarbonyl having to 1 to 4 carbon atoms in the alkyl radical,
alkylamino having 1 to 4 carbon atoms in the alkyl radical,
arylamino having 6 to 12 carbon atoms,
alkylcarbonylamino having 2 to 5 carbon atoms,
aminosulfonyl, and
alkylaminosulfonyl having 1 to 4 carbon atoms in the alkyl radical, and

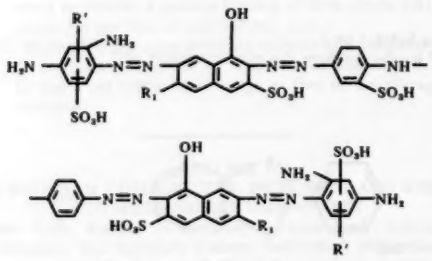
A^3 is acetoacetic acid arylamide.

4,033,946
TETRAKISAZO DYESTUFFS

Hermann Goebel, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 14, 1972, Ser. No. 280,146
Claims priority, application Germany, Aug. 14, 1971, 2140867
Int. Cl.² C09B *35/36*
U.S. Cl. 260—166 **2 Claims**

1. The tetrakisazo dyestuff which in the acid form corresponds to the general formula



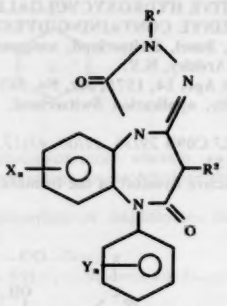
wherein
$R' = H, CH_3$, or Cl
$R_1 = H$ or SO_3H.

4,033,947
1H-S-TRIAZOLO[4,3-a][1,5]BENZODIAZEPIN-1,5(6H)-DIONES

B. Richard Vogt, Yardley, Pa., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Oct. 5, 1973, Ser. No. 404,071
Int. Cl.² C07D *487/22*
U.S. Cl. 260—239.3 T **12 Claims**

1. A compound of the formula



wherein R′ is H; phenyl optionally substituted by a member selected from the group consisting of alkyl of 1–3 carbons or alkoxy of 1–3 carbons, halogen, trifluoromethyl or nitro; or alkyl of 1–3 carbons optionally substituted by a member selected from the group consisting of amino, mono-alkylamino of 1–3 carbons or di-alkylamino wherein each alkyl radical contains 1–3 carbons, or phenyl optionally substituted by alkyl of 1–3 carbons or alkoxy of 1–3 carbons, halogen, trifluoromethyl, or nitro;

R^2 is H, alkyl of 1–3 carbons, hydroxy or alkanoyloxy of 1–4 carbons;

X occupies the 8- and/or 9-positions and is selected from the group consisting of H, F, Cl, Br, trifluoromethyl, alkyl of 1–4 carbons or alkoxy of 1–4 carbons, nitro, cyano, amino, alkanoylamino of 1–4 carbons, alkylthio of 1–4 carbons, alkylsulfinyl of 1–4 carbons or alkyl sulfonyl of 1–4 carbons;

Y may be the same as or different from X and occupies one or two of the 2′-, 4′-, or 5′-positions and is selected from the group consisting of H, F, Cl, trifluoromethyl, alkyl of 1–4 carbons or alkoxy of 1–4 carbons, alkylthio of 1–4 carbons or alkyl sulfonyl of 1–4 carbons;

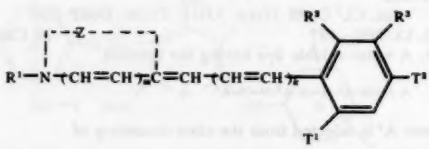
and n is 0, 1 or 2.

4,033,948
ACUTANCE AGENTS FOR USE IN THERMALLY-DEVELOPABLE PHOTOSENSITIVE COMPOSITIONS

Harvey A. Brown, Lake Elmo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 17, 1976, Ser. No. 687,003
Int. Cl.² C07D *207/30, 215/00*
U.S. Cl. 260—240 A **3 Claims**

1. A methine arylidene dye base represented by the formula:



wherein:

Z represents the atom necessary to complete a mono- or polycyclic dihydroheterocyclic nucleus having 5 to 6 atoms in the ring including the N of the formula;

R^1 is an alkyl, substituted alkyl, alkenyl or aryl group;

$m = 0$ or 1;

$k = 0$, 1 or 2;

T^1 is an aprotic electron-withdrawing group having a σ_{para} value of 0.45 to 0.63 selected from CF_3 and CN;

T^2 is NO_2; and

R^2 and R^3 are hydrogen or together constitute a condensed carbocyclic aromatic ring.

4,033,949

ANALOGS OF THROMBOXANE B_2 AND PROCESSES FOR THEIR SYNTHESIS

Robert C. Kelly, Kalamazoo, and Norman A. Nelson, Galesburg, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

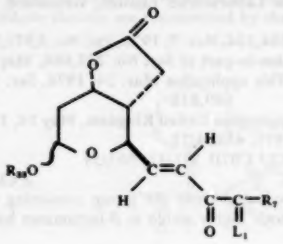
Continuation-in-part of Ser. No. 676,890, April 14, 1976. This application Aug. 20, 1976, Ser. No. 716,450

Int. Cl.² C07D *493/04, 309/02, 309/16*

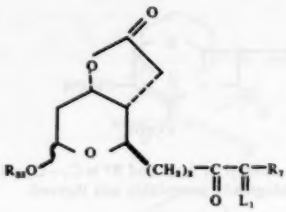
U.S. Cl. 260—240 R 41 Claims

19. A thromboxane intermediate of the formula

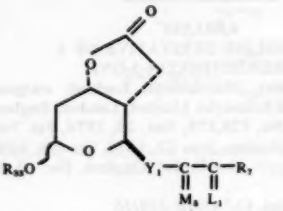
(a)



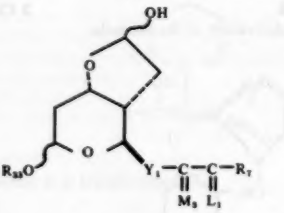
(b)



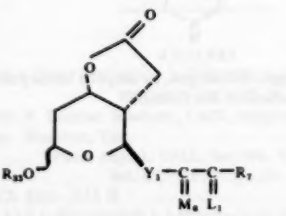
(c)



(d)

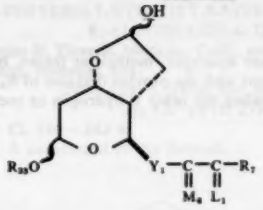


(e)

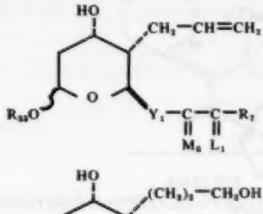


-continued

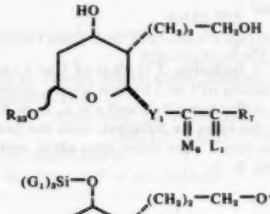
(f)



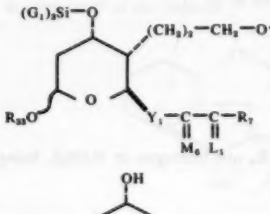
(g)



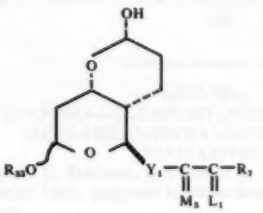
(h)



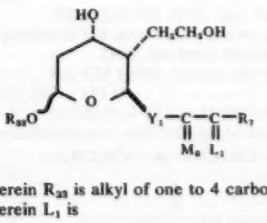
(i)



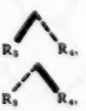
(j)



(k)



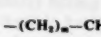
wherein R_{33} is alkyl of one to 4 carbon atoms, inclusive; wherein L_1 is



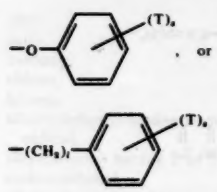
or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different with the proviso that one of R_3 and R_4 is methyl only when the other is hydrogen or methyl;
wherein R_7 is



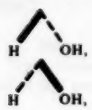
(1)



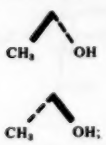
(2) or (3)

wherein *l* is 0, 1, 2, or 3.
wherein *m* is one to 5, inclusive, T is alkyl of 1 to 3 carbon atoms, inclusive, alkoxy of 1 to 3 carbon atoms, inclusive, chloro, fluoro, or trifluoromethyl, and *s* is 1, 2, or 3, the various T's being the same or different, with the proviso that not more than two T's are other than alkyl, with the further proviso that R_7 is

only when R_3 and R_4 are hydrogen or methyl, being the same or different;
wherein M_5 is

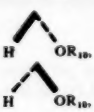


or a mixture of

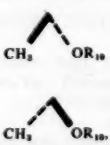


and

wherein Y_1 is trans—CH=CH— or $-CH_2CH_2-$;
wherein M_6 is



or a mixture of



and

wherein R_{10} is a blocking group;
wherein G_1 is alkyl of 1 to 4 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, phenyl, or phenyl substituted with one or 2 fluoro, chloro, or alkyl of one to 4 carbon atoms, with the proviso that in the $-Si-(G_1)_3$ moiety the various G_1's are the same or different; and
wherein *g* is 1, 2, or 3 and *n* is 1 or 2.

4,033,950

3-HYDROXYMETHYL-7β-(2-ALKOXY-OR BENZYLOXYIMINO-2-ARYLACETAMIDO)CEPH-3-EM-4-CARBOXYLIC ACIDS AND SALTS THEREOF

Martin Christopher Cook; Gordon Ian Gregory, both of Chalfont St. Peter, and Janice Bradshaw, Harrow, all of England, assignors to Glaxo Laboratories Limited, Greenford, England

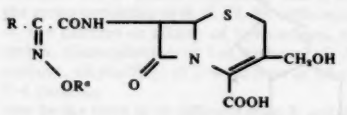
Division of Ser. No. 304,524, Nov. 7, 1972, Pat. No. 3,971,778, which is a continuation-in-part of Ser. No. 252,666, May 12, 1972, abandoned. This application Mar. 24, 1976, Ser. No. 669,818

Claims priority, application United Kingdom, May 14, 1971, 15082/71; Oct. 1, 1971, 45884/71

Int. Cl.² C07D *501/32, 501/34*

U.S. Cl. 260—243 C **3 Claims**

1. A compound selected from the group consisting of a cephalosporin antibiotic highly stable to β-lactamases having the formula



wherein R is phenyl, thienyl or furyl and R^a is C_1—C_6 alkyl or benzyl; and a physiologically acceptable salt thereof.

4,033,951

MORPHOLINE DERIVATIVE OF A 1,4-BENZOTHIAZIN-3-ONE

Roy Frederick Maisey, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 528,578, Nov. 29, 1974, Pat. No. 3,989,699. This application June 22, 1976, Ser. No. 698,780

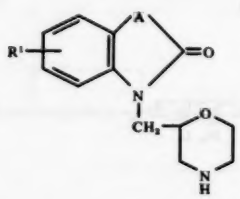
Claims priority, application United Kingdom, Dec. 13, 1973, 57743/73

Int. Cl.² C07D *279/16*

U.S. Cl. 260—243 R **3 Claims**

1. A morpholine derivative of the formula:

I



wherein R^1 is hydrogen or halogen, or alkyl or alkoxy of 1 to 3 carbons; A is a radical of the formula:

wherein R^2 and R^3, which may be the same or different, are hydrogen or alkyl of 1 to 3 carbons and B is sulphur, and the non-toxic, pharmaceutically-acceptable acid-addition salts thereof.

4,033,952

1,1,1-TRICHLORO-3-NITRO-3-(TETRAHYDRO-2H-1,3-THIAZIN-2-YLIDENE)-2-PROPANONE

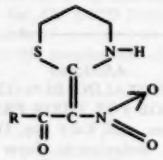
Charles H. Tieman, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

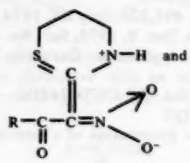
Filed July 19, 1976, Ser. No. 706,312

Int. Cl.² C07D *279/06*

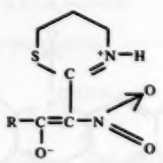
U.S. Cl. 260—243 R **1 Claim**

1. A resonance hybrid in which the significant forms which contribute thereto are represented by the formla

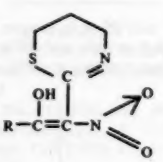




and



and including the enol form represented by the formula



wherein R is trichloromethyl.

4,033,953

3-(5,6-DIHYDRO-4H-1,3-THIAZIN-2-YL)-3-NITRO-2-PROPENOIC ACID

Charles H. Tieman, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 2, 1976, Ser. No. 710,937

Int. Cl.² C07D *279/06*

U.S. Cl. 260—243 R **1 Claim**

1. 3-(5,6-dihydro-4H-1,3-thiazin-2-yl)-3-nitro-2-propenoic acid.

4,033,954

3,4-DIHYDRO-7-HYDROXY-8-NITRO-2H-PYRROLO(2,1-B)-(1,3)THIAZIN-6(7H)-ONE

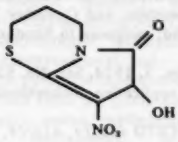
Charles H. Tieman, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 5, 1976, Ser. No. 711,932

Int. Cl.² C07D *279/08*

U.S. Cl. 260—243 R **1 Claim**

1. A compound of the formula



4,033,955

3,4-DIHYDRO-8-NITRO-2H-PYRROLO(2,1-B)(1,3)THIAZIN-7(6H)-ONE

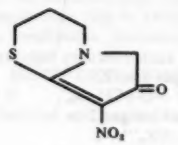
James E. Powell, Salida, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 10, 1976, Ser. No. 713,157

Int. Cl.² C07D *279/08*

U.S. Cl. 260—243 R **1 Claim**

1. A compound of the formula



4,033,956

7[α-AMINO-ω-(2,3-METHYLENEDIOXY-PHENYL-)ACYLAMIDO]CEPHALOSPORANIC ACID DERIVATIVES

Raymond C. Erickson, and Ronald E. Bambury, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

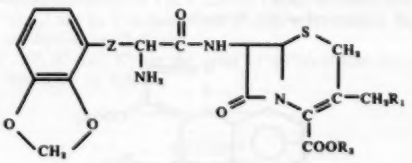
Filed July 22, 1975, Ser. No. 598,151

The portion of the term of this patent subsequent to Apr. 26, 1994, has been disclaimed.

Int. Cl.² C07D *501/20, 501/22, 501/36*

U.S. Cl. 260—243 C **8 Claims**

1. A 7-[α-amino-ω-(2,3-methylenedioxyphenyl) acylamido]cephalosporanic acid having the formula:



wherein

Z is selected from the group consisting of a sigma bond, methylene and ethylene;

R_1 is selected from the group consisting of hydrogen, hydroxy, acetoxy, pyridinium and —S—R_2;

R_2 is a heterocycle selected from the group consisting of pyrazolyl, imidazolyl, triazolyl, tetrazolyl, thiazolyl, isothiazolyl, thiadiazolyl, oxazolyl, isoxazolyl, oxadizole,

pyrimidinyl, pyrazinyl, pyridazinyl and the mono or dimethyl and mono or diethyl derivatives thereof;

R_3 is selected from the group consisting of hydrogen, formyloxymethyl and alkanoyloxmethyl in which the alkanoyl group contains from 1 to 5 carbon atoms; and the pharmaceutically acceptable salts thereof.

4,033,957
TRIAZINE DERIVATIVES AS STABILIZERS FOR ORGANIC MATERIALS

Kurt Hofer, Munchenstein, and Guenther Tscheulin, Riehen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

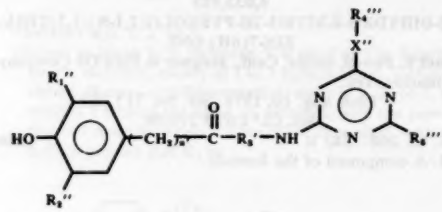
Filed Dec. 3, 1974, Ser. No. 529,024

Claims priority, application Switzerland, Dec. 10, 1973, 17269/73

Int. Cl.² C07D *401/14, 413/14, 251/04*

U.S. Cl. 260—246 B **10 Claims**

1. A compound of the formula



wherein

R_1'' and R_2'' are each a tertiary butyl radical,

n' is 0 or an integer 1 or 2,

R_3' is —NH— or $-O-(CH_2)_{m'}-$,

wherein m' is an integer 2 or 3,

X'' is —S— or $-NR_6'''-$,

wherein R_6''' is hydrogen, C_1-_{18} alkyl, unsubstituted phenyl or phenyl monosubstituted by C_1-_4 alkyl,

R_4''' is, independently, one of the significances of R_6''', or R_4''', together with R_6''' and the common nitrogen atom, form a piperidine or morpholine ring, and

R_5''' is, independently, one of the significances of $-X'\lambda'-R_4'''$.

4,033,958
4-MORPHOLINO DERIVATIVES OF PYRAZOLO[1,5-a]-QUINOXALINE-3-CARBOXYLIC ACIDS AND ESTERS

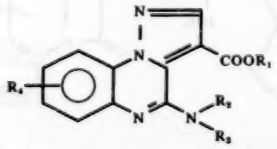
Uwe D. Treuner, Regensburg, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 628,277, Nov. 3, 1975, Pat. No. 3,994,893. This application Aug. 18, 1976, Ser. No. 715,600

Int. Cl.² C07D *487/04*

U.S. Cl. 260—247.2 B **3 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen or lower alkyl;

is morpholino;

R_4 is hydrogen, lower alkyl or halogen; and acid addition salts thereof.

4,033,959
PROCESS FOR PREPARING CHLOROISOCYANURATE COMPLEX COMPOUNDS

Ronald H. Carlson, Willingboro, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed July 19, 1976, Ser. No. 706,274

Int. Cl.² C07D *251/36*

U.S. Cl. 260—248 C **8 Claims**

1. A process for preparing hydrated {(mono-trichloro,) tetra-(monopotassium dichloro,)} penta-isocyanurate, which comprises bringing together and reacting in a substantially dry state potassium dichloroisocyanurate monohydrate and dichloroisocyanuric acid monohydrate in amounts such that the molar ratio of said monohydrate to said acid is in the range of 1:1 to 3:1.

4,033,960
2-MERCAPTOQUINOXALINE-DI-N-OXIDE PRODUCTS AND A METHOD FOR THEIR PREPARATION

Florin Seng, Schildgen, and Kurt Ley, Odenthal-Gloebusch, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

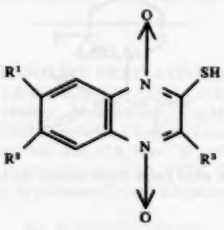
Division of Ser. No. 491,226, July 24, 1974, abandoned. This application Dec. 9, 1975, Ser. No. 639,084

Claims priority, application Germany, July 31, 1973, 2334722

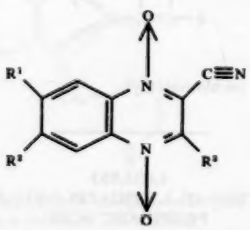
Int. Cl.² C07D *241/52*

U.S. Cl. 260—250 QN **20 Claims**

1. Process for the preparation of a mercapto compound of the formula:



wherein each of R^1 and R^2 is hydrogen, lower alkyl, lower alkoxy, trifluoromethyl or halo and R^3 is methyl, hydroxy or amino which comprises treating a nitrile of the formula:



with hydrogen sulfide or an alkali metal or alkaline earth metal salt thereof in a solvent and, when a salt of hydrogen sulfide is used, converting the resultant mercaptide salt into the corresponding free mercapto compound by acidification with a nonoxidizing and nonreducing organic or inorganic acid.

4,033,961
PYRIDO[2-1-b]QUINAZOLIN-ONES AND THEIR METHODS OF PREPARATION

Charles F. Schwender, Lebanon, and Brooks R. Sunday, Hackettstown, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 7, 1975, Ser. No. 620,471
Int. Cl.² C07D *239/88*
U.S. Cl. 260—251 A **7 Claims**

1. 7-cyano-11-oxo-11H-pyrido[2,1-b]quinazoline.

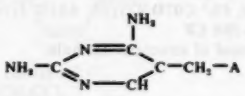
7. 2-methoxy-11-oxo-11H-pyrido[2,1-b]quinazoline-8-carboxylic acid.

4,033,962
2,4-DIAMINO-PYRIMIDINE DERIVATIVES AND PROCESSES

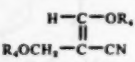
Perry Rosen, North Caldwell, N.J., assignor to Hoffman-La Roche Inc., Nutley, N.J.

Filed June 26, 1975, Ser. No. 590,755
Int. Cl.² C07D *239/22*
U.S. Cl. 260—256.4 N **7 Claims**

1. A process for the preparation of a pyrimidine of the formula

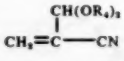


wherein A is aryl which comprises the steps of (a) reacting an aromatic benzene derivative with an acrylonitrile selected from the group consisting of a compound of the formula



V

and a compound of the formula



VI

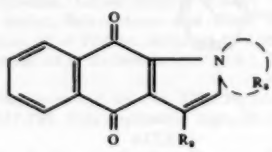
wherein R_4 is, independently, lower alkyl whereby the corresponding enol ether or a mixture thereof with its corresponding acetal is obtained, and subsequently, (b) treating the reaction mixture of step (a) with guanidine.

4,033,963
NAPHTHOQUINONE DERIVATIVES

Bansi Lal Kaul, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

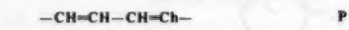
Division of Ser. No. 411,086, Oct. 30, 1973, Pat. No. 3,931,163. This application Sept. 15, 1975, Ser. No. 613,336
Int. Cl.² C07D *471/04*
U.S. Cl. 260—256.4 C **4 Claims**

1. A compound of formula Ia,



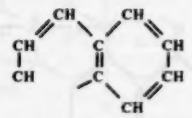
Ia

wherein R_3 is a radical of formula P



P

or a radical of formula Q



Q

which radicals are unsubstituted or mono-substituted by chloro, bromo, methyl, methoxy, aminocarbonyl, methylaminocarbonyl, ethylaminocarbonyl, dimethylaminocarbonyl, diethylaminocarbonyl, phenylaminocarbonyl, methoxycarbonyl or ethoxycarbonyl, and

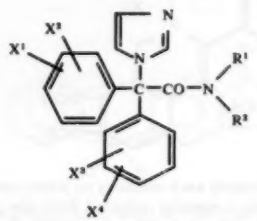
R_9 is pyrimidyl or pyrimidyl substituted by up to three substituents selected from the group consisting of hydroxy, methoxy, ethoxy, amino, methylamino, ethylamino, dimethylamino, diethylamino, di-hydroxyethylamino, phenylamino, chloro, bromo and mono-chlorophenylamino.

4,033,964
IMIDAZOLYLACETIC ACID AMIDES, THEIR PRODUCTION, ANTIMYCOTIC COMPOSITIONS COMPRISING SAID COMPOUNDS AND THEIR USE AS ANTIMYCOTIC AGENTS

Jürgen Wenzelburger; Karl Heinz Büchel; Manfred Plempel, and Werner Meiser, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 400,263, Sept. 24, 1973, Pat. No. 3,950,354. This application July 9, 1975, Ser. No. 594,569
Claims priority, application Germany, Sept. 26, 1972, 2247187
Int. Cl.² C07D *403/12*
U.S. Cl. 260—268 C **11 Claims**

1. An imidazolylacetice acid amide of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R^1 and R^2, together with the nitrogen atom to which they are attached form a saturated [5 to 7-] 6-membered heterocyclic ring having a —NY— moiety wherein Y is alkoxycarbonyl of 2 to 4 carbon atoms, dialkylaminocarbonyl of 1 to 4 carbon atoms in each alkyl moiety, phenyl or diphenylmethyl, and

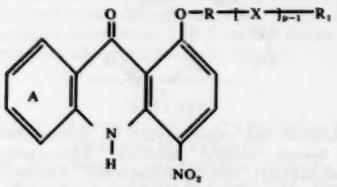
X^1, X^2, X^3 and X^4 are the same or different and are each hydrogen or halogen.

4,033,965
NITRO ACRIDONE DYES

Kurt Burdeska, Basel, and Hansrudolf Schwander, Riehen;, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 16, 1975, Ser. No. 568,767
Claims priority, application Switzerland, Apr. 17, 1974, 5287/74; Nov. 19, 1974, 15367/74
Int. Cl.² C09B *15/00;* **C07D** *219/08*
U.S. Cl. 260—279 R **10 Claims**

1. A disperse dye of the formula



wherein p is 1 or 2, R is a straight-chain alkylene of 2 to 4 carbon atoms which may be interrupted by sulphur or oxygen atoms or a branched alkylene of 2 to 4 carbon atoms which is unsubstituted or substituted by hydroxy, R_1 is phenyl or phenyl substituted by C_1–C_4-alkyl, C_1–C_2-alkoxy, halogen, phenyl, trifluoromethyl or lower carbalkoxy, X is oxygen or sulphur atom, the rings A and B can carry further non-ionic substituents selected from the group consisting of C_1–C_4-alkyl, C_1–C_2-alkoxy, halogen, alkylthio, nitro, cyano, trifluoromethyl, phenoxy, phenyl or acetamido, and the ring A can carry a further fused benzo ring.

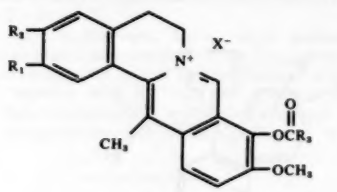
4,033,966

NOVEL BERBINE DERIVATIVES

Yoshio Sawa, Nishinomiya, Japan, assignor to Kanebo, Ltd., Tokyo, Japan

Filed June 24, 1975, Ser. No. 589,920
Int. Cl.² C07D *215/20*
U.S. Cl. 260—286 Q **5 Claims**

1. A berbine derivative of the formula:



wherein R_1 and R_2 represent each methoxy or jointly methylenedioxy, R_3 represents a member selected from the group consisting of methyl, 4-methoxyphenyl and phenylvinyl, and X represents a pharmaceutically acceptable anion.

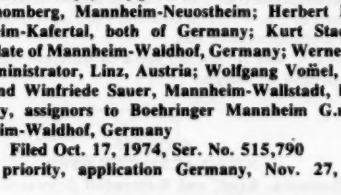
4,033,967

CYCLOPENTENO[1,2-H]QUINOL-4-ONE DERIVATIVES

Alfred Rhomberg, Mannheim-Neuostheim; Herbert Berger, Mannheim-Kafertal, both of Germany; Kurt Stach, deceased, late of Mannheim-Waldhof, Germany; Werner Plattner, administrator, Linz, Austria; Wolfgang Vomel, Mannheim, and Winfriede Sauer, Mannheim-Wallstadt, both of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed Oct. 17, 1974, Ser. No. 515,790
Claims priority, application Germany, Nov. 27, 1973, 2358909
The portion of the term of this patent subsequent to Aug. 26, 1992, has been disclaimed.
Int. Cl.² C07D *215/56*
U.S. Cl. 260—287 CF **6 Claims**

1. Cyclopenteno-quinolone compound of the formula



(I)

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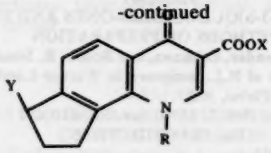


wherein

R is saturated or unsaturated aliphatic hydrocarbyl of up to 5 carbon atoms,

X is hydrogen or alkyl of up to 5 carbon atoms,

Y is halogen

and the pharmacologically compatible salts thereof.

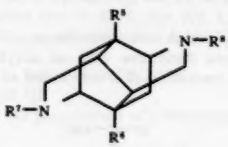
4,033,968

DIAZATETRACYCLODODECANES

Jan ten Broeke, Somerset; Edward J. J. Grabowski, Westfield, both of N.J.; Lars M. Flataker, Lansdale, Pa.; Michael H. Fisher, Bridgewater, and Arthur A. Patchett, Cranford, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

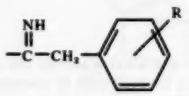
Filed Apr. 14, 1976, Ser. No. 676,769
Int. Cl.² C07D *471/08*; A61K *31/435*
U.S. Cl. 260—288 CF **7 Claims**

1. A compound of structural formula:



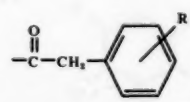
or pharmaceutically acceptable salt thereof, wherein R^5 and R^6 are the same or different and each is

1. —CN,

2. 

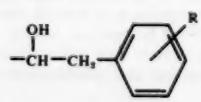
R is hydrogen, lower alkoxy, fluoro, chloro, bromo, or hydroxy,

3. —COO (lower alkyl),
4. —$CONH_2$,
5. —CO (halo),
6. —COOH,
7. —CH_2OH,
8. —CHO,
9. —CH_2 (halo),

10. 

11. —CH_2NH_2,

12.

13. 

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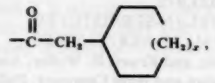
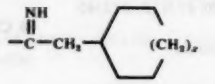
14. 

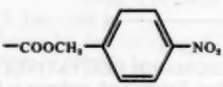
wherein X = 0 or 1; or

15. 

wherein X = 0 or 1, and

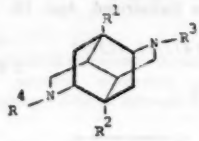
R^7 and R^8 are the same or different, and each is

1. lower alkyl,
2. lower alkenyl,
3. phenyl-lower alkyl, wherein the phenyl group is unsubstituted or substituted with C_{1-3}-alkoxy or halo,
4. hydrogen,
5. —COOBz,

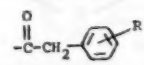
6. 

7. —COO (lower alkyl),
8. $-COOCH_2CCl_3$.

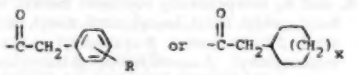
4. A compound of structural formula:



or pharmaceutically acceptable salt thereof, wherein:

R^1 is 

wherein R is hydrogen, fluoro, chloro, bromo, lower alkoxy or hydroxy;

R^2 is 

wherein X is 0 or 1;

R^3 is hydrogen or C_{1-2} alkyl; and

R^4 is C_{1-2} alkyl.

4,033,969

VINCAMINE DERIVATIVES

Thierry Sevenet, Gif-sur-Yvette; Claude Thal, Malakoff; Pierre Potier, Bois d'Arcy, and Henri Philippe Husson, Chevreuse, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

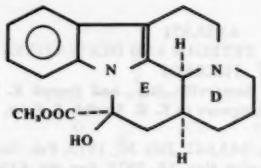
Continuation-in-part of Ser. No. 370,334, June 15, 1973, Pat. No. 3,937,709. This application Sept. 29, 1975, Ser. No. 617,695

Claims priority, application France, June 19, 1972, 72.220210

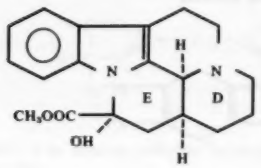
Int. Cl.² C07D *459/00*

U.S. Cl. 260—293.53 **1 Claim**

1. 20 -Deethyl-vincamine, under its racemic and optically active forms, having the formula:



and its stereoisomer, having the formula:



4,033,970

VARIOUS 1,5,10,11-TETRAHYDROBENZO [4,5]-CYCLOHEPTA [1,2-b]PYRAZOLO[4,3-e]PYRIDINE DERIVATIVES

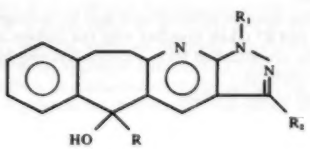
Hans Hoehn, Tegernheim, Germany; Jack Bernstein, New Brunswick, N.J., and Berthold Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed June 23, 1976, Ser. No. 698,992

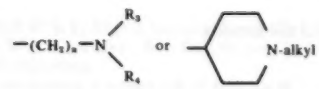
Int. Cl.² C07D *471/04*

U.S. Cl. 260—293.61 **12 Claims**

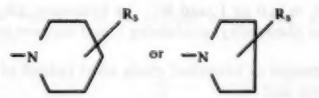
1. A compound of the formula:



wherein R_1 is lower alkyl of 1 to 4 carbons, phenyl, benzyl or phenethyl; R_2 is hydrogen, lower alkyl of 1 to 4 carbons, or phenyl; R is



wherein alkyl is straight or branched chain of 1 to 4 carbons and R_3 and R_4 are the same or different and each is lower alkyl of 1 to 4 carbons or R_3 and R_4 taken together with the N-atom form a heterocyclic ring selected from the group consisting of



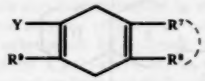
wherein R_5 is hydrogen, lower alkyl of 1 to 4 carbons, or lower alkoxy of 1 to 4 carbons; *n* is an integer from 3 to 6; and a pharmaceutically acceptable acid addition salt thereof.

4,033,971
CYCLOHEXANE TETROLS AND DERIVATIVES THEREOF

Frederic Peter Hauck, Somerville, N.J., and Joseph E. Sundeen, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

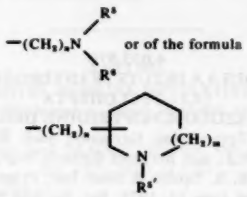
Division of Ser. No. 383,642, July 30, 1973, Pat. No. 3,936,465. This application Nov. 18, 1975, Ser. No. 633,046
Int. Cl.² C07D 211/32
U.S. Cl. 260—293.72 6 Claims

1. A compound of the formula



wherein

Y is a radical of the formula

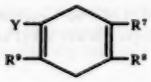


wherein *n* is 1–6, *m* is 0 or 1, R^5 is hydrogen, alkyl of 1 to 3 carbons, or phenylalkyl containing 1 to 3 carbons in the alkyl group, and R^6 and R^6 together with the nitrogen to which they are attached are pyrrolidino, or piperidino;

R^9 is H, or a straight or branched chain alkyl radical of 1–6 carbon atoms;

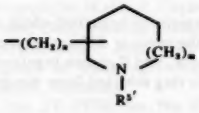
R^7 and R^8 are the same or different and may be hydrogen or alkyl, or R^7 and R^8 taken together with the carbon atoms to which they are attached form a cycloalkyl ring having from 5 to 7 carbons.

2. A compound of the formula



wherein

Y is a radical of the formula



wherein *n* is 1–6, *m* is 0 or 1, and R^5 is hydrogen, alkyl of 1 to 3 carbons, or phenylalkyl containing 1 to 3 carbons in the alkyl group;

R^9 is H or a straight or branched chain alkyl radical of 1–6 carbon atoms; and

R^7 and R^8 are the same or different and are hydrogen or alkyl of 1–4 carbon atoms.

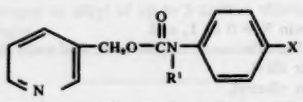
3. A compound as defined in claim 2 having the name 4-(3,6-dihydro-2-methylbenzyl)-N-methylpiperidine.

4,033,972
3-PYRIDYLMETHYL-(N-SUBSTITUTED PHENYL)-CARBAMATE DERIVATIVES

Edward E. Kilbourn, Chalfont, and Ernest D. Weiler, Ambler, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 497,542, Aug. 14, 1974, Pat. No. 3,925,397. This application Sept. 9, 1975, Ser. No. 611,759
Int. Cl.² C07D 417/12, 213/46
U.S. Cl. 260—294.8 D 6 Claims

1. A compound of the formula



where

X is cyano, methylthio, or nitro; and

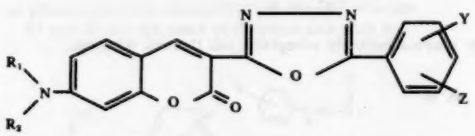
R^1 is 2-thenyl when X is cyano or nitro; and when X is methylthio, R^1 is allyl, benzyl or 2-thenyl.

4,033,973
OXADIAZOL-5-YL-COUMARIN DERIVATIVES

Hansrudolf Schwander, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 540,063, Jan. 10, 1975, abandoned, which is a continuation of Ser. No. 335,635, Feb. 26, 1973, abandoned. This application Mar. 25, 1976, Ser. No. 670,309
Claims priority, application Switzerland, Apr. 18, 1972, 5691/72
Int. Cl.² C07D 413/14, 413/04
U.S. Cl. 260—295 F 5 Claims

1. A dyestuff of the formula



wherein

R_1 and R_2 independently represent methyl, ethyl, propyl, butyl, pentyl, hexyl, heptyl, octyl, nonyl, decyl, β-chloroethyl, β-hydroxyethyl, β-cyanoethyl, γ-cyanopropyl, β-methoxyethyl, β-acetoxyethyl, β-butyryloxyethyl, methoxycarbonylethyl, ethoxycarbonylethyl, phenylethyl or benzyl; and

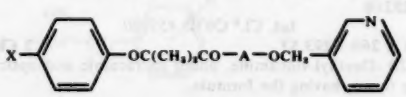
Y and Z independently represent lower alkyl, lower alkoxy, hydroxy, halo or hydrogen.

4,033,974
PYRIDYLMETHYL ESTERS OF N-(PHENOXYALKANOYL)PEPTIDE DERIVATIVES

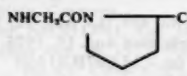
Jean-Marie Ferland, St. Laurent; Amedeo Failli, Montreal; Hans U. Immer, Mount Royal, and Manfred K. Gotz, Hudson, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 505,103, Sept. 11, 1974, Pat. No. 3,956,484. This application Feb. 11, 1976, Ser. No. 657,118
Int. Cl.² C07D 213/55
U.S. Cl. 260—295.5 R 6 Claims

1. A compound of the formula



in which X is selected from the group consisting of bromine, chlorine and lower alkyl and A is selected from the group consisting of $NHCH_2CO$, $NHCH_2CONHCH_2CO$ and



and acid addition salts thereof with pharmaceutically acceptable acids.

4,033,975

PROCESS FOR THE PRODUCTION OF 2-AMINO-3-HYDROXYPYRIDINE DERIVATIVES

Günter Mattern, Liestal, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

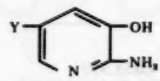
Filed May 10, 1976, Ser. No. 684,692

Claims priority, application Switzerland, May 13, 1975, 6158/75

Int. Cl.² C07D *213/61*

U.S. Cl. 260—296 R **8 Claims**

1. Process for the production of 2-amino-3-hydroxypyridine derivatives of formula I

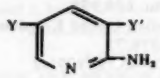


(I)

wherein

Y represents chlorine or bromine,

which process comprises reacting a 2-amino-3,5-dihalogenopyridine of formula II



(II),

in which the two symbols Y and Y′ can be identical or different and represent chlorine or bromine, at 140°–240° C in the presence of a base with water.

4,033,976

COPPER-OXAZOLINE COMPLEX

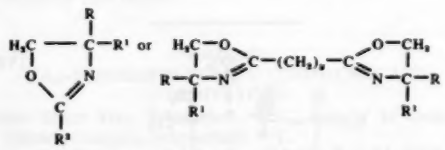
Juozas Briedis, Lemont, and Louis A. Jurisch, Marengo, both of Ill., assignors to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Oct. 28, 1975, Ser. No. 626,607

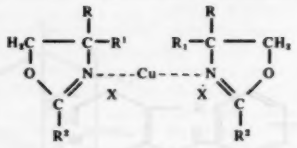
Int. Cl.² C07F *1/08*

U.S. Cl. 260—299 **14 Claims**

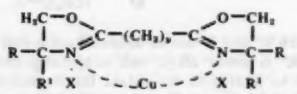
1. A complex of copper and an oxazoline represented by the formula



where R and R^1 are alkyl radicals of 1–3 carbon atoms, or hydroxymethyl and can be the same or different; R^2 is alkyl of from 1 to 4 carbon atoms or alkenyl of 2–4 carbon atoms; and *y* is an integer of 1 to 4, said complex being represented by the formula



or



where X is an acetate, chloride, bromide, nitrate, formate or sulfate ion.

4,033,977

4H-PYRANO[4,3-d]THIAZOLE DERIVATIVES AND PROCESS THEREFOR

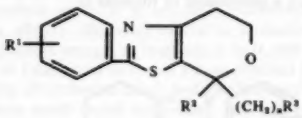
Adolf H. Philipp, St. Laurent, and Leslie G. Humber, Dollard des Ormeaux, both of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Oct. 1, 1975, Ser. No. 618,643

Int. Cl.² C07D *515/00*

U.S. Cl. 260—302 F **17 Claims**

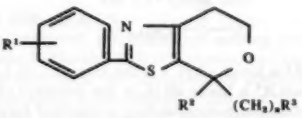
1. A compound of formula I



(I)

in which R^1 is hydrogen, halogen, lower alkyl, lower alkoxy or nitro; R^2 is lower alkyl; R^3 is COOH or $CH_2NR^4R^5$ in which R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; and *n* is the integer one or two; or a pharmaceutically acceptable salt thereof.

16. A process for preparing a compound of formula I



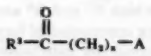
(I)

in which R^1 is hydrogen, halogen, lower alkyl, lower alkoxy or nitro; R^2 is lower alkyl; R^3 is COOH and *n* is the integer 1 or 2, which comprises:

a. condensing a compound of formula II

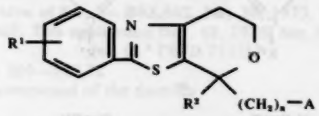
(II)

in which R^1 is as defined herein with a compound of formula



in which R^2 is lower alkyl, *n* is the integer 1 or 2 and A is $COOR^6$ in which R^6 is lower alkyl, in the presence of an acid

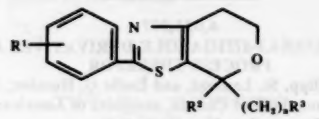
catalyst, to obtain the corresponding compound of formula IV



(IV)

in which R^1 and R^2 are as defined herein and A is $COOR^6$ in which R^6 is lower alkyl, and subjecting the last-named compound to hydrolysis to obtain the corresponding compound of formula I in which R^3 is COOH.

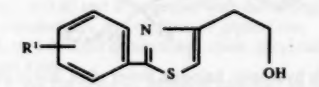
17. A process for preparing a compound formula I



(I)

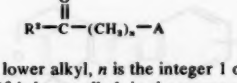
in which R^1 is hydrogen, halogen, lower alkyl, lower alkoxy or nitro; R^2 is lower alkyl; R^3 is $CH_2NR^4R^5$ in which R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl; and *n* is the integer 1 or 2, which comprises:

a. condensing a compound of formula II

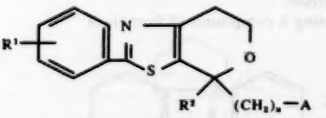


(II)

in which R^1 is as defined herein with a compound of formula



in which R^2 is lower alkyl, *n* is the integer 1 or 2 and A is $COOR^6$ in which R^6 is lower alkyl, in the presence of an acid catalyst, to obtain the corresponding compound formula IV



(IV)

in which R^1 and R^2 are as defined herein and A is $COOR^6$ in which R^6 is lower alkyl, and subjecting the last-named compound to hydrolysis to obtain the corresponding compound of formula IV in which A is COOH, subjecting the last-named product to amidation with an appropriate amine of formula NHR^4R^5 in which R^4 and R^5 are as defined herein to give the corresponding compound of formula IV in which A is $CONR^4R^5$, and reducing the last-named compound with a complex metal hydride to give the corresponding compound of formula I in which R^1 and R^2 are as defined herein and R^3 is $CH_2NR^4R^5$ as defined herein.

4,033,978

THIACYCL[2.2.2]AZINE CARBOXYLIC ACIDS

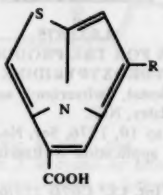
Karl G. Untch, Los Altos, and John O. Gardner, Palo Alto, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 499,713, Aug. 22, 1974, Pat. No. 3,920,672. This application Aug. 15, 1975, Ser. No. 604,983

Int. Cl.² C07D *513/16*

U.S. Cl. 260—306.7 R **6 Claims**

1. A compound represented by the formula



wherein R is phenyl or phenyl monosubstituted in the meta or para position with fluoro, chloro, lower alkyl of from 1 to 4 carbon atoms or lower alkoxy of from 1 to 4 carbon atoms, and the pharmaceutically acceptable salts thereof.

4,033,979

ORGANIC COMPOUNDS

Peter Hubert Bentley, Rudgwick, and John Peter Clayton, Horsham, both of England, assignors to Beecham Group Limited, England

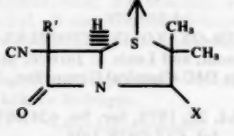
Division of Ser. No. 566,695, April 10, 1975, Pat. No. 3,996,235, which is a division of Ser. No. 443,724, Feb. 19, 1974, Pat. No. 3,936,446. This application Jan. 21, 1976, Ser. No. 650,958

Claims priority, application United Kingdom, Feb. 5, 1973, 5577/73; Feb. 5, 1973, 5578/73

Int. Cl.² C07D *499/42*

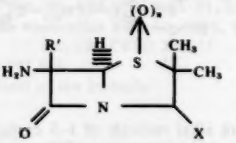
U.S. Cl. 260—306.7 C **8 Claims**

1. A process for the conversion of a compound of the formula:



(VII)

wherein *n* is zero or 1, X is COOH, a non-toxic salt thereof or a conventional penicillin ester, and hydroxyalkyl, alkoxycarbonylalkyl, aralkoxycarbonyl-alkyl, aralkyl or alkylthio into a compound of the formula:



(VIII)

which comprises reacting a compound of the formula (VII) with an acid capable of converting CN to NH_2 and which does not cleave the β-lactam ring of the penam.

4,033,980
PHTHALOCYANINE DYESTUFFS AND PROCESS FOR PREPARING THEM

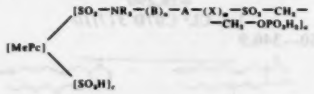
Fritz Meininger, Frankfurt am Main; Klaus Hunger, Kelkheim, Taunus, and Hartmut Springer, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 851,091, Aug. 18, 1969, abandoned. This application Aug. 18, 1972, Ser. No. 281,790

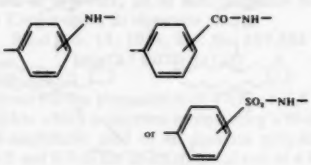
Int. Cl.² C09B *47/04*

U.S. Cl. 260—314.5 **3 Claims**

1. A water-soluble phthalocyanine dyestuff of the formula



wherein MePc is copper phthalocyanine, nickel phthalocyanine or cobalt phthalocyanine and wherein the sulfonic acid and the sulfonamide groups are linked to the 3-position or the 4-position of the phthalocyanine benzene rings, *a* and *c* each is an integer or a fractional number in the range 1 to 3, the sum of *a* and *c* being at most 4, R_3 is hydrogen or methyl, B is $-CH_2-CH_2-$, $-CH_2-CH_2-NH-$,



A is phenylene, naphthylene, hydroxyphenylene, methoxyphenylene, methylphenylene, dimethoxyphenylene, methylmethoxyphenylene, sulfo-phenylene, carboxy-phenylene, bromo-phenylene, nitrophenylene or hydroxy-nitro-phenylene, X is $-CH_2-$ or $-N(CH_3)-$ and *n* and *m* each is 0 or 1, the sum of *m* and *n* being 0 or 1.

4,033,981
THIANTHRENE AND PHENOXATHIINE S-OXIMIDES

Peter Stoss, Wildtal, and Gerhard Satzinger, Denzlingen, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

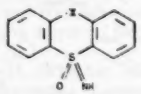
Division of Ser. No. 496,600, Aug. 12, 1974, Pat. No. 3,978,052. This application Mar. 3, 1976, Ser. No. 663,312

Claims priority, application Germany, Aug. 17, 1973, 2341653

Int. Cl.² C07D *339/08, 327/08*

U.S. Cl. 260—327 M **3 Claims**

1. Tricyclic sulphoximide of the general formula:



wherein X is oxygen, sulfur, or the pharmacologically compatible salts thereof.

4,033,982
3,4,5-TRITHIAPOLYCYCLO COMPOUNDS AND DERIVATIVES

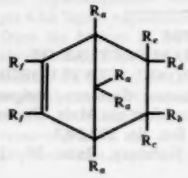
Allan Stuart Hay, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 515,349, Oct. 16, 1974, abandoned. This application Jan. 21, 1976, Ser. No. 651,190

Int. Cl.² C07D *341/00*

U.S. Cl. 260—327 H **7 Claims**

1. A process for the preparation of a 3,4,5-trithiapolycyclo compound which comprises the reaction of sulfur with a bicyclo[2.2.1]hept-2-ene compound of the formula:



wherein each R_a, R_b, R_c, R_d and R_e when taken singly can be hydrogen, halogen, alkyl of from 1 to about 15 carbon atoms, aryl of from 6 to about 15 carbon atoms, and cycloalkyl of from 4 to about 10 carbon atoms; R_b and R_d when taken singly can be alkenyl of from 2 to about 10 carbon atoms, hydroxyl, hydroxyalkyl of from 1 to about 10 carbon atoms, dialkylamino of from 1 to about 10 carbon atoms, dialkylaminoalkyl of from 1 to about 4 carbon atoms per alkyl group, and alkoxy of from 1 to about 10 carbon atoms; R_f can be hydrogen or alkyl of from 1 to about 15 carbon atoms; R_b and R_c taken together and R_d and R_e taken together can be alkylidene of from 1 to about 6 carbon atoms; R_b and R_d taken together are the divalent —CHYCH=CY— group in which Y is hydrogen or methyl, said reaction being carried out at a temperature within the range of from about 0° to about 200° C. in the presence of a phenol of the formula:

$$(R)_m\,[Ar](OH)_n$$

wherein Ar is an arene radical having a valence of at least one and having at least one —OH radical attached directly to an arene carbon atom, R is an alkyl, cycloalkyl, aryl, halide, hydroxy, alkoxy, alkanoate radical or a combination thereof, *m* is a positive integer at least equal to 0, and *n* is a positive integer at least equal to 1, and a base selected from the group consisting of elemental alkali and alkaline earth metals, alkali or alkaline earth metal hydroxides, and salts of strong bases and weak organic acids.

4,033,983
NONFLAMMABLE COATING MATERIAL

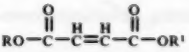
Charles M. Starks, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Dec. 17, 1975, Ser. No. 641,856

Int. Cl.² C08K *5/01*

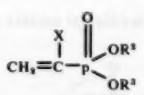
U.S. Cl. 260—33.6 UA **4 Claims**

1. An improved, nonflammable coating composition containing vinyl chloride, dialkyl maleates, and bis-2-chloro alkyl vinyl phosphonates, the improvement comprising forming a tertelomer using a free radical initiator in the presence of at least, based on one mole of vinyl chloride, 0.25 moles of xylene, and from about 0.01 to 1 moles vinyl phosphonate and 0.05 to 0.5 moles of dialkyl maleate, wherein the maleate is defined by:



(I)

and wherein the phosphonate is defined by:



(II)

wherein R and R^1 are the same or different alkyl radicals containing from 3 to 15 carbon atoms, R^2 and R^3 are the same or different alkyl radicals containing from 1 to 15 carbon

atoms and x is selected from the group consisting of hydrogen, halogens, and alkyls, cyanoalkyls and haloalkyls containing from 1 to 18 carbon atoms.

4,033,984

PROCESS FOR THE MANUFACTURE OF PERFLUORALKOXY-PROPIONIC ACID FLUORIDE

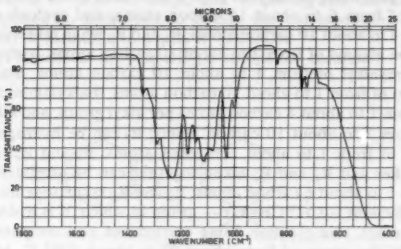
Thomas Martini, Neuenhain, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 18, 1975, Ser. No. 597,382

Claims priority, application Germany, June 20, 1974, 2434992

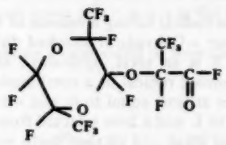
Int. Cl.² C07D 319/10

U.S. Cl. 260—340.6 **8 Claims**

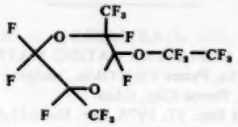


1. A perfluoro-α-[3,6-dimethyl-1,4-dioxanyl-2-oxy]-propionic acid fluoride of formula

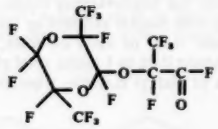
III



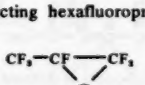
2. A perfluoro-2-ethoxy[3,6-dimethyl-1,4-dioxane] of the formula



3. A process for the preparation of a perfluoralkoxypropionic acid fluoride of the formula



which comprises reacting hexafluoropropene oxide of the formula



with a phosphoric acid tris-(dialkyl amide) of the formula

wherein R_1, R_2 and R_3 each represent a di-alkyl amine, the alkyl groups having from 1 to 4 carbon atoms, said reaction being carried out at a temperature of from −50° C to +10° C, and recovering said perfluoralkoxypropionic acid fluoride.

4,033,985

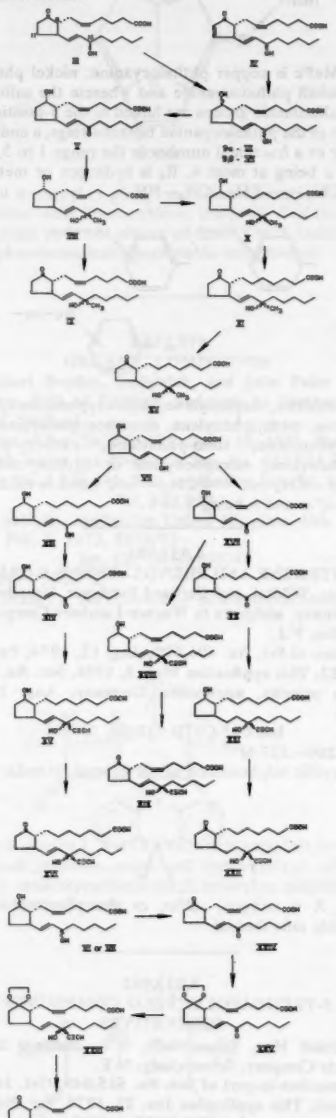
15-SUBSTITUTED PROSTANOIC ACID

Donald Peter Strike, St. Davids, Pa., assignor to American Home Products Corporation, New York, N.Y.

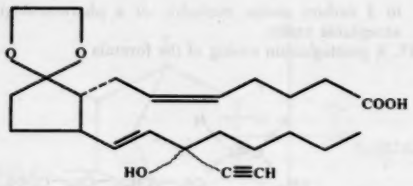
Division of Ser. No. 569,026, April 17, 1975, which is a division of Ser. No. 462,006, April 18, 1974, which is a continuation-in-part of Ser. No. 383,007, July 26, 1973, Pat. No. 3,922,802. This application Apr. 19, 1976, Ser. No. 678,290

Int. Cl.² C07D 317/10

U.S. Cl. 260—340.9 **1 Claim**



1. A compound of the Formula:



4,033,986
PROCESS FOR THE PREPARATION OF 4-BROMO-1,8-NAPHTHALIC ACID ANHYDRIDE

Richard L. Castenson, Coventry; James R. Hazen, and Rex Y. Tien, both of Warwick, all of R.I., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Feb. 11, 1976, Ser. No. 657,304
Int. Cl.² C07D 311/02
U.S. Cl. 260—345.2 **8 Claims**

1. A process for the preparation of 4-bromo-1,8-naphthalic acid anhydride which comprises brominating a di-alkali metal salt of 1,8-naphthalic acid in an aqueous solution at a pH between 6.5 and 9.5 to the di-alkali metal salt of 4-bromo-1,8-naphthalic acid with a brominating agent comprising
1. an alkali metal bromide, or
2. molecular bromine,
in the presence of either
a. a hypochlorite, or
b. chlorine gas and alkali,
at a temperature between 0° and 30° C.

4,033,987
ISOLATING NAPHTHOQUINONE AND PHTHALIC ANHYDRIDE FROM NAPHTHALENE OXIDATION PRODUCT

Joachim Priemer, Odenthal; Norbert Schenk, Leverkusen; Jorg Krekel, Essen, and Wulf Schwerdtel, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 16, 1976, Ser. No. 706,093
Claims priority, application Germany, July 19, 1975, 2532388
Int. Cl.² C07D 307/89; C07C 49/66
U.S. Cl. 260—346.4 **15 Claims**

1. A process for isolating naphthoquinone and phthalic anhydride from the gases obtained from the oxidation of naphthalene, comprising passing the gases obtained from the oxidation of naphthalene at a temperature of about 250° to 500° C and under pressure into a quencher, passing into said quencher in counter-current to said gas a liquid which contains naphthalene, naphthoquinone and phthalic anhydride, taking off liquid at a temperature of less than about 200° C from the sump of the quencher, cooling part of this liquid and recycling it to the top of the quencher, cooling being effected with a liquid coolant which has a temperature at most about 70° C below that of the liquid to be cooled, at the top of the quencher removing a gas at a temperature of less than about 150° C, which gas still contains only small amounts of naphthalene, naphthoquinone and phthalic anhydride, scrubbing this gas with liquid naphthalene supplied to the top of a scrubber, from the bottom of the scrubber removing naphthalene containing small amounts of naphthoquinone and phthalic anhydride, feeding a minor proportion of the removed naphthalene to the quencher, cooling the major proportion of the removed naphthalene and recycling it for further scrubbing, and removing from the top of the scrubber a gas which is virtually free from naphthoquinone and phthalic anhydride.

4,033,988
DERIVATIVES OF 17α-HYDROXY, 19-NORPREGN-4-ENE-3,20-DIONE

Jean Marie Gastaud, 3 avenue du prince pierre, Monte Carlo, Monaco

Filed June 20, 1975, Ser. No. 588,959
Claims priority, application United Kingdom, June 28, 1974, 28882/74
Int. Cl.² C07J 1/00
U.S. Cl. 260—397.4 **1 Claim**

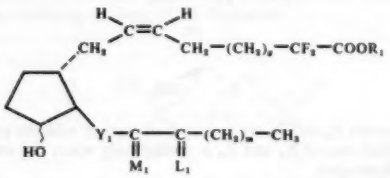
1. 3,20-Diketo-7α-acetylthio-17α-acetoxy-19-norpregnene-4.

4,033,989
9-DEOXY-PGF$_2$ ANALOGS

Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Sept. 17, 1975, Ser. No. 614,243
Int. Cl.² C07C 177/00
U.S. Cl. 260—408 **69 Claims**

1. A prostaglandin analog of the formula



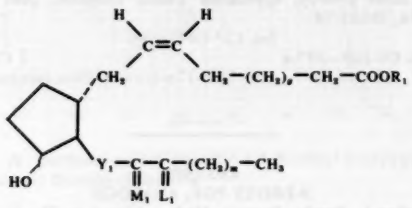
wherein Y_1 is cis—CH=CH— or trans —CH=CH—;
wherein g is one 2, or 3;
wherein M_1 is

or

wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_1 is

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro;
wherein m is one to 5, inclusive; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

36. A prostaglandin analog of the formula



wherein Y_1 is cis—CH=CH— or trans—CH=CH—;
wherein g is one, 2, or 3;
wherein M_1 is

or

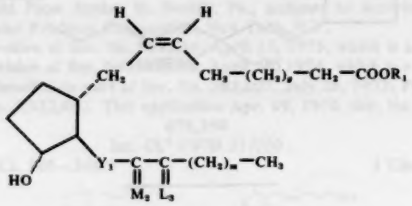
wherein R_5 and R_6 are hydrogen or methyl, with the proviso that one of R_5 and R_6 is methyl only when the other is hydrogen;
wherein L_2 is

or a mixture of

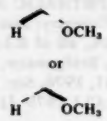
and

wherein R_3 and R_4 are hydrogen or fluoro, being the same or different, with the proviso that at least one of R_3 and R_4 is fluoro;
wherein m is one to 5, inclusive; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

57. A prostaglandin analog of the formula

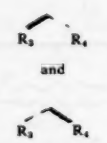


wherein Y_1 is cis—CH=CH— or trans—CH=CH—.
wherein g is one, 2, or 3;
wherein M_2 is



wherein L_3 is

or a mixture of



wherein R_3 and R_4 are hydrogen or methyl, being the same or different;
wherein m is one to 5, inclusive; and
wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

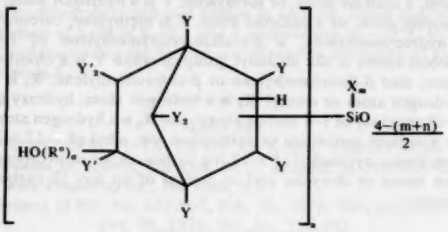
4,033,990

HYDROXYBICYCLOSILOXANE RIGID URETHANE FOAM STABILIZERS

George M. Omietanski, Marietta, Ohio; Harold D. Furbee, Sistersville, W. Va., and Vincent T. Chuang, Marietta, Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 29, 1972, Ser. No. 319,788
Int. Cl.[2] C07F 7/08
U.S. Cl. 260—448.2 B 9 Claims

1. A hydroxybicyclosiloxane consisting essentially of: (A) at least one hydroxybicyclosiloxane unit having the formula:



wherein Y is hydrogen or an alkyl group containing from 1 to 4 carbon atoms inclusive, Y′ is hydrogen or an alkyl group containing from 1 to 12 carbon atoms inclusive, R° is a divalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, *a* has a value of 0 or 1, X is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, *m* has a value of 0, 1 or 2, *n* has a value of 1 or 2, and (*m*+*n*) has a value of 1, 2 or 3, each hydroxybicyclosiloxane group has no more than 20 carbon atoms; and (B) at least hydrocarbylsiloxane units represented by the formula:

wherein *p* has a value of 1, 2 or 3 and Z is a monovalent hydrocarbon group free of aliphatic carbon to carbon multiple bonds, the molecular weight of the siloxane portion of the hydroxybicyclosiloxane being from about 250 to about 1300 inclusive, and, when dihydrocarbylsiloxane units (Z_2SiO units) are present, the ratio of hydroxybicyclosiloxane units to dihydrocarbylsiloxane units is at least 0.5 to 1.0.

4,033,991

METHOD FOR PREPARING ORGANOSILANES CONTAINING SILICON-BONDED OXIME GROUPS

Toshio Shinohara, and Masatoshi Arai, both of Annaka, Japan, assignors to Shin-Etsu Chemical Company, Limited, Tokyo, Japan

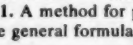
Filed Dec. 23, 1975, Ser. No. 643,812

Claims priority, application Japan, Dec. 26, 1974, 50-2933

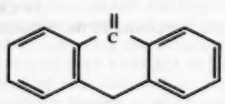
Int. Cl.² C07F 7/08, 7/10

U.S. Cl. 260—448.2 E **11 Claims**

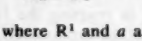
1. A method for preparing an organosilane represented by the general formula



where R^1 is a monovalent hydrocarbon group selected from the class consisting of alkyl, alkenyl, aryl and aralkyl groups and halogen- or cyano-substituted groups thereof; Y is a group denoted by $R^2R^3C=$ or $R^4C=$, R^2 and R^3, which may be identical or different, having the same meaning as R^1 defined above and R^4 being a divalent group selected from alkylene groups, halogen-substituted groups thereof and a group represented by the formula



and *a* is 0, 1, 2 or 3, which comprises reacting a halogenosilane represented by the general formula



where R^1 and *a* are as defined above and X is a halogen atom with a metal oxime represented by the general formula

where Y is as defined above and M is an alkali metal.

4,033,992

NOVEL COMPOUNDS OF THE 11-DEOXYPROSTAGLANDIN E_2,$F_{2\alpha}$, AND $F_{3\beta}$ SERIES

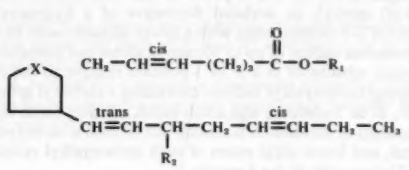
Charles Vincent Grudzinskas, 21 5th Ave., Nyack, N.Y. 10960, and Martin Joseph Weiss, 975 Phillis Lane, Oradell, N.J. 07649

Division of Ser. No. 526,772, Nov. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 300,011, Oct. 24, 1972, abandoned. This application Dec. 29, 1975, Ser. No. 645,066

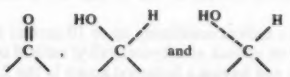
Int. Cl.² C07C 177/00

U.S. Cl. 260—456 R **14 Claims**

1. A compound selected from the group embracing the 15(S) and 15(R) configurations and consisting of those of the formula:



wherein R_1 is selected from the group consisting of hydrogen and alkyl having up to 12 carbon atoms; R_2 is selected from the group consisting of hydroxy, formyloxy, alkanoyloxy having up to four carbon atoms and alkanesulfonyloxy having up to four carbon atoms; X is a divalent radical selected from the group consisting of those of the formulae:



and the pharmacologically acceptable cationic salts thereof when R_1 is hydrogen.

4,033,993

CYCLOALKYL CARBONATES

Klaus Bruns, Krefeld-Traar, and Peter Meins, Mettmann, both of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

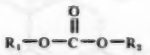
Filed Apr. 14, 1976, Ser. No. 676,932

Claims priority, application Germany, Apr. 25, 1975, 2518392

Int. Cl.² C07C 69/96; A61K 7/46

U.S. Cl. 260—463 **5 Claims**

1. A carbonic acid ester of the formula



wherein R_1 is cycloalkyl having from 8 to 12 carbon atoms, and R_2 is a member selected from the group consisting of alkyl having from 1 to 5 carbon atoms, alkenyl having from 2 to 5 carbon atoms and alkynyl having from 2 to 5 carbon atoms.

4,033,994

SUBSTITUTED p-MENTHANES

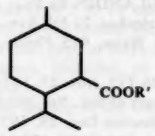
Hugh R. Watson, Wargrave; David G. Rowsell, Staines, and John H. D. Browning, Wokingham, all of England, assignors to Wilkinson Sword Limited, England

Continuation-in-part of Ser. No. 221,753, Jan. 28, 1972, abandoned. This application July 8, 1974, Ser. No. 486,652

Int. Cl.² C07C *69/74*

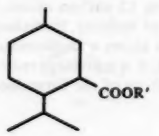
U.S. Cl. 260—468 R 6 Claims

1. Compounds of the formula:



where R' is an aliphatic radical of up to 10 carbon atoms selected from: mono- and poly-hydroxyalkyl and cycloalkyl radicals containing from 2 to 10 carbon atoms and having a hydroxyl group in one or more of the 2-, or 3-position and a hydrogen atom in the 1-position; (2,2-dimethyl-1,3-dioxolan-4-yl) methyl; an acylated derivative of a hydroxyalkyl radical of 2–9 carbon atoms with a lower alkanoic acid; an aryl hydrocarbon radical of up to 10 carbon atoms and containing a hydroxyl substituent in a 2- or 3-position relative to the ester grouping; carboxyalkyl radicals containing a carboxyl group it the 1-, 2- or 3-position; and alkali metal, alkaline earth metal, ammonium or substituted amonium salt of such a carboxyalkyl radical; and lower alkyl esters of such carboxyalkyl radicals.

6. Compounds of the formula:



wherein R' is a radical containing up to 10 carbon atoms, said radical being an adduct of a hydroxyalkyl radical of at least 2 carbon atoms and having a hydroxyl group in the 2, or 3-position and a hydrogen atom in the 1-position, with from 1 to 3 moles of a lower alkylene oxide.

4,033,995

D-HOMO STEROIDS

Robert C. Nickolson; Ulrich Kerb, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

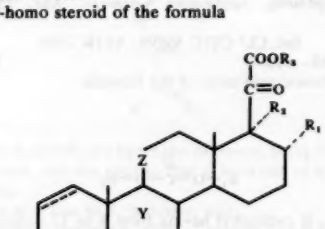
Filed Sept. 2, 1975, Ser. No. 609,707

Claims priority, application Germany, Sept. 4, 1974, 2442616

Int. Cl.² C07J *63/00*

U.S. Cl. 260—468.5 20 Claims

1. A D-homo steroid of the formula



X

wherein is a single bond or a double bond; X is a hydrogen atom, a fluorine atom, or methylene; Y is a hydrogen atom, a fluorine atom, or a chlorine atom; Z is methylene, carbonyl, β-hydroxymethylene, a β-n-alkanoyloxymethylene of 1–4 carbon atoms in the alkanoyl group or when Y is a chlorine atom, also β-fluoromethylene or β-chloromethylene; R_1 is a hydrogen atom or methyl; R_2 is a hydrogen atom, hydroxy or n-alkanoyloxy of 1–4 carbon atoms; and R_3 is a hydrogen atom or a sodium, potassium or ammonium ion, alkyl of 1–12 carbon atoms, cycloalkyl of 3–12 rng carbon atoms or hydrocarbon mono or di-cyclic aryl or aralkyl of up too 12 carbon atoms.

4,033,996

8-AZA-9-OXO(AND DIOXO)-THIA-11,12-SECOPROSTAGLANDINS

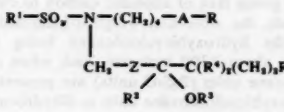
Edward J. Cragoe, Jr., Lansdale, and James H. Jones, Blue Bell, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 580,497, May 23, 1975, abandoned, which is a continuation-in-part of Ser. No. 418,341, Nov. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 354,273, April 25, 1973, abandoned. This application Mar. 22, 1976, Ser. No. 669,123

Int. Cl.² C07C *143/74*, *143/75*, *145/02*

U.S. Cl. 260—490 26 Claims

1. A compound of the formula:



wherein

R is carboxy, a carboxy salt, said salt being formed from a pharmaceutically acceptable cation selected from the group of metals and amines or a derivatized carboxy having the formula —COOY, wherein; Y is alkyl having 1–10 carbon atoms;

A is ethylene, trimethylene, α-methylethylene, β-methylethylene, α,α-dimethylethylene, or β,β-dimethylethylene;

y is 1 or 2

R^1 is methyl, ethyl, propyl, or isopropyl;

Z is ethylene, vinylene, or ethynylene;

R^3 is hydrogen or loweralkanoyl;

R^2 is hydrogen, methyl, ethyl, or propyl;

R^4 is independently hydrogen or methyl; and

R^5 is selected from the group consisting of hydrogen, lower alkyl of 1–4 carbon atoms either straight or branched.

4,033,997

PREPARATION OF DOPAMINE DERIVATIVES

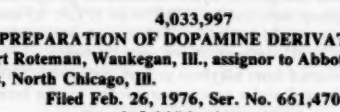
Robert Roteman, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Feb. 26, 1976, Ser. No. 661,470

Int. Cl.² C07C *68/02*, *69/96*

U.S. Cl. 260—463 10 Claims

1. The process for making a compound of the formula



I

where R is hydrogen or an inert radical and R' is hydrogen or benzyloxycarbonyl, consisting essentially in reacting the N-carboxyanhydride of a natural aminoacid of the formula NH_2-

CHR-COOH wherein R has the above meaning with dopamine or its dibenzyloxycarbonyl analog in an inert, liquid reaction medium at a pH of 8–12.5 and a temperature of −10° C to 5° C and recovering the formed acyldopamine derivative of said formula I.

4,033,998

VINYLBENZYL ESTER OF AN N-BOC AMINO ACID

Nicholas D. Harris, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Division of Ser. No. 659,967, Feb. 20, 1976. This application Oct. 28, 1976, Ser. No. 736,403

Int. Cl.² C07C *125/06*

U.S. Cl. 260—471 C 1 Claim

1. The vinylbenzyl ester of N-tertiarybutyloxy carbonyl-O-benzyl-L-tyrosine.

4,033,999

PROCESS FOR PREPARING A CARBOXYLIC ESTER

Takeru Onoda, and Keisuke Wada, both of Yokohama, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 548,779, Feb. 10, 1976, abandoned. This application May 5, 1976, Ser. No. 683,529

Claims priority, application Japan, Feb. 12, 1974, 49-16922

Int. Cl.² C07C *67/05*

U.S. Cl. 260—488 CD 14 Claims

1. In a process for preparing a carboxylic ester of a substituted benzene compound having one or two hydroxymethyl groups on the benzene ring by reacting a benzene compound selected from the group consisting of toluene and xylene, a lower alkanoic acid, and molecular oxygen in the gaseous phase in the presence of a catalyst, the improvement which comprises:

reacting said reactants over a supported catalyst wherein the active constituents consist essentially of:

a. palladium metal,

2. and antimony component substantially as the oxide thereof, and

3. at least one carboxylic acid salt of an alkali metal, an alkaline earth metal, zinc, cadmium or lead or a carrier.

4,034,000

DIFUNCTIONAL POLYMERIC DIENES

Emanuel Schoenberg, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 310,910, Sept. 23, 1963, abandoned, which is a continuation-in-part of Ser. No. 9,161, Feb. 17, 1960, abandoned. This application July 1, 1970, Ser. No. 51,715

Int. Cl.² C07C *154/00, 51/15, 20/00, 31/18*

U.S. Cl. 260—502.6 3 Claims

3. A process for producing relatively high molecular weight difunctional polydienes of at least 370 molecular weight consisting essentially of (A) reacting finely divided lithium metal with isoprene in a solvent to form a lithium metal polymeric diene adduct, the ratio of lithium to isoprene being in the range of 1 to 2 to about 1 to 26 at a temperature less than 30° C., (B) immediately after the formation of the lithium metal polymeric diene adduct reacting said adduct with a functionality imparting compound to form a lithium polymeric compound, (C) treating the lithium polymeric compound to replace lithium with hydrogen to yield a compound characterized by high reactivity with an organo diisocyanate to yield a polyurethane having a dilute solution viscosity of at least about 0.4, said solvent comprisng at least 60 percent by weight of an ether, said ether being selected from the class consisting of diethyl ether, tetrahydrofuran and dimethoxyethane, and said functionality imparting compound being selected from the class consisting of carbon dioxide, propylene oxide, alkanals of less than 5 carbon atoms, alkanones of less than 5 carbon atoms, and carbon disulfide.

4,034,001

BIS-AMIDOALKANESULFONIC ACIDS AND SALTS THEREOF

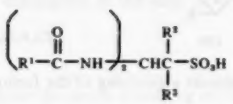
Leonard Edward Miller, Chagrin Falls, and Donald Leon Murfin, Mentor, both of Ohio, assignors to The Lubrizol Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 216,290, Jan. 7, 1972, abandoned, and a continuation-in-part of Ser. No. 889,806, Dec. 12, 1969, abandoned, which is a division of Ser. No. 619,923, March 2, 1967, Pat. No. 3,531,442. This application July 28, 1975, Ser. No. 599,613

Int. Cl.² C07C *143/16*

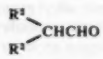
U.S. Cl. 260—513 N 15 Claims

1. A compound having the formula



wherein R^1 is an alkenyl radical having no more than about 12 carbon atoms and each of R^2 and R^3 is hydrogen or an alkyl radical having up to about 18 carbon atoms.

7. A method for preparing a compound according to claim 1 which comprises reacting, at a temperature between about −30° and 250° C., an aldehyde of the formula



with a nitrile of the formula R^1CN and a sulfonating agent comprising sulfuric acid, sulfur trioxide or fuming sulfuric acid, wherein R^1, R^2 and R^3 are as defined in claim 1.

4,034,002

PROSTAGLANDIN DERIVATIVES

Donald P. Strike, St. Davids, and Wen-Ling Kao, Devon, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

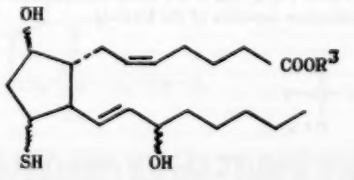
Division of Ser. No. 384,769, Aug. 1, 1973, Pat. No. 3,845,042. This application Aug. 2, 1974, Ser. No. 494,138

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² C07C *149/26*

U.S. Cl. 260—514 D 2 Claims

1. A compound of the formula:



wherein R^3 is hydrogen or lower alkyl.

4,034,003
15-CYCLOALKYL-PROSTAGLANDINS

Masaki Hayashi; Seiji Kori, both of Takatsuki; Hajimu Miyake, Suita; Takashi Yamato, Takatsuki, and Hisashi Suga, Nishinomiya, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

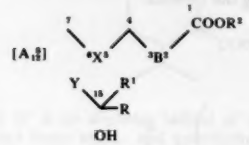
Filed Apr. 8, 1975, Ser. No. 566,147

Claims priority, application United Kingdom, Apr. 11, 1974, 16241/74; Nov. 8, 1974, 48535/74

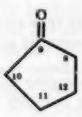
Int. Cl.² C07C *177/00*

U.S. Cl. 260—514 D **7 Claims**

1. A compound of the formula:



wherein A represents a grouping of the formula:



X represents ethylene, Y represents trans-vinylene, B represents trans-vinylene, R represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 4 carbon atoms, R_1 represents cycloalkyl of 4–7 carbon atoms, and R_2 represents a hydrogen atom or a straight- or branched-chain alkyl group containing from 1 to 12 carbon atoms and cyclodextrin clathrates of such acids and esters and, when R_2 represents a hydrogn atom, non-toxic salts thereof.

4,034,004
PROCESS FOR THE PREPARATION OF CARBOXYLIC ACIDS FROM ORGANIC HALIDES

Luigi Cassar; Marco Foà, both of Novara, and Andrea Gardano, Trino Vercellese (Vercelli), all of Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

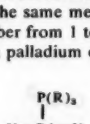
Filed June 10, 1975, Ser. No. 585,756

Claims priority, application Italy, June 11, 1974, 23849/74

Int. Cl.² C07C *63/00*

U.S. Cl. 260—515 R **8 Claims**

1. A process for the preparation of carboxylic acid by reaction of carbon monoxide with an organic halide selected from the group consisting of aromatic and aliphatic halides, and catalyzed by a phosphine palladium complex selected from the group consisting of (a) a palladium complex of the formula $Pd[P(R)_3]_m$ wherein m is a whole number from 2 to 4, and $(R)_3$ represents a homogeneous or heterogeneous group consisting of phenyl and alkyl radicals; (b) a palladium complex of the formula $Pd[P(R)_2—(CH_2)_n—P(R_2)]_p$ wherein $(R)_2$ has the same meaning indicated above for $(R)_3$, p is a whole number from 1 to 2, and m is a whole number from 1 to 6; or (c) a palladium complex of the formula



wherein the groups $(R)_3$, equal to or different from each other have the same meaning as indicated above, and Y is a halogen atom and an aryl radical

and in the presence of a quaternary alkyl-ammonium salt having a total of at least 6 carbon atoms, characterized in that said process is conducted in a double liquid phase consisting of (a) said organic halide and said catalytic palladium complex or their solutions in a hydrocarbon solvent immiscible with H_2O, and (b) an aqueous sodium hydroxide or potassium hydroxide solution containing said quaternary alkyl-ammonium salt

at a temperature between about 50° and 150° C, the molar ratio of Pd/organic halide being between 0.1 and 0.0001 and the molar ratio of sodium or potassium hydroxide/organic halide being greater than equimolar, and

acidifying the resulting intermediate product to obtain said carboxylic acid.

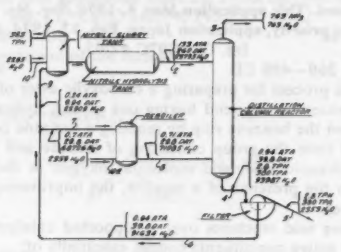
4,034,005
PROCESS FOR MAKING AROMATIC ACIDS

Allen W. Hancock, II, Media, and William D. Vanderwerff, West Chester, both of Pa., assignors to Sun Ventures, Inc., St. Davids, Pa.

Filed June 17, 1975, Ser. No. 587,756

Int. Cl.² C07C *63/14, 63/06*

U.S. Cl. 260—515 P **12 Claims**



1. In the process for making an aromatic carboxylic acid of high purity by feeding an essentially equilibrium hydrolysis mixture of an aromatic nitrile to a reactive distillation column operated at a temperature of from about 200° C. to about 325° C. at autogenous pressure where the equilibrium mixture is subjected simultaneously to further hydrolysis and distillation of ammonia, removing water vapor and ammonia from the top of the column, subjecting remaining equilibrium hydrolysis mixture to further hydrolysis and distillation in a reboiler, returning vapor from the reboiler to the distillation column, removing an aqueous solution of product acid from the reboiler, cooling said separated solution, and separating aromatic acid product, the improvement of returning the aqueous filtrate from said separate aromatic acid product to a lower portion of said column whereby product purity is enhanced.

3. The process of claim **1** where the aromatic nitrile is a phthalonitrile.

4,034,006
PROCESS FOR THE MANUFACTURE OF ALKALI SALTS OF 3,5-DISUBSTITUTED 4-HYDROXYBENZOIC ACIDS AND THEIR FREE ACIDS

Hanns Lind, Liestal; Jean Rody, Basel, and Heimo Brunnetti, Reinach, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 282,638, Aug. 21, 1972, abandoned. This application Feb. 24, 1975, Ser. No. 552,527

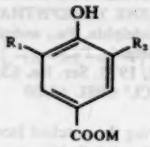
Claims priority, application Switzerland, Sept. 28, 1971, 14105/71

Int. Cl.² C07C *51/15*

U.S. Cl. 260—521 C **6 Claims**

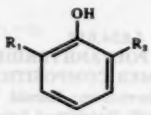
1. A process for the manufacture of compounds of the general formula I

-continued



(I)

wherein R_1 and R_2 are both tert.-butyl, sec.-butyl or cycloocytl, or R^1 is tert.-butyl and R_2 is methyl or R_1 is tert.-butyl and R_2 is cyclohexyl, and M is hydrogen or an alkali metal atom, in which process a phenol of the general formula II



(II)

wherein R_1 and R_2 have the meaning indicated under the formula I, is treated, in a mixture of water and a dipolar aprotic solvent, with an alkali metal hydroxide and the reaction product, after removal of the water, is reacted, without intermediate isolation and in the organic medium, at elevated temperature, with carbon dioxide under normal pressure and the acid is optionally liberated from the resulting alkali metal salt.

4,034,007

PROCESS FOR THE PRODUCTION OF HALOGENATED AROMATIC CARBOXYLIC ACIDS

Roy Tully Gottesman, Glen Rock, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Jan. 7, 1972, Ser. No. 216,279

Int. Cl.² C07C *51/33*

U.S. Cl. 260—524 R **8 Claims**

1. In the process for the production of halogenated aromatic carboxylic acids which comprises contacting a halogenated alkylbenzene having the structural formula

wherein X represents a halogen atom; R represents an alkyl group having from 1 to 4 carbon atoms or a haloalkyl group having from 1 to 4 carbon atoms and from 1 to 4 halogen atoms; and *m* and *n* each represents a number in the range of 1 to 5, the sum of *m* and *n* being in the range of 2 to 6, with an oxygen-containing gas in the presence of about 0.01 percent to 5 percent, based on the weight of the halogenated alkylbenzene, of a heavy metal oxidation catalyst selected from the group consisting of cobalt, manganese, and vanadium salts of alkanoic acids having 1 to 8 carbon atoms, benzoic acid, and naphthenic acids at a temperature between about 130° C. and the boiling point of said halogenated alkylbenzene and at a pressure in the range of about 10 p.s.i. to 75 p.s.i., the improvement that comprises carrying out the oxidation in the presence of at least 0.001 mole per mole of halogenated alkylbenzene of epichlorohydrin.

4,034,008

PROCESS FOR PREPARING UNSATURATED ACIDS AND ALDEHYDES

Abraham Nathan Kurtz; Erlind Magnus Thorsteinson, and Harry Joe Decker, all of Charleston, W. Va., assignors to Union Carbide Corporation, New York, N.Y.

Filed Aug. 25, 1975, Ser. No. 606,973

Int. Cl.² C07C *51/32, 45/04*

U.S. Cl. 260—533 N **9 Claims**

1. A process for the production of C_3 to C_4 alpha-beta unsaturated aliphatic carboxylic acid and C_3 to C_4 alpha-beta unsaturated aliphatic aldehyde by vapor phase catalytic oxidation of the corresponding unsaturated C_3 to C_4 mono-alpha-olefin with molecular oxygen in the presence of steam which comprises contacting the reaction mixture with a calcined oxidation catalyst which is devoid of potassium and which contains the elements Mo, Bi, Fe, T, Si and X in the form of oxides and which contains the elements Mo, Bi, Fe, T, Si, X and Cl, prior to calcination, in the ratio

$$Mo_aBi_bFe_cT_dSi_eX_fCl_g$$

wherein

T is selected from the group consisting of Ni and Co,

X is selected from the group consisting of Ru and Sb,

a is 10,

b is 0.1 to 5.0,

c is d/3 to d/5,

d is 2.0 to 9.0,

e is 1 to 20,

f is 0.1 to 1.0, and

g is 0 to 5.

4,034,009

4-UREIDO-2-ACYL PHENOXYPROPANOLAMINE

Gerhard Zölss, Linz; Heribert Pittner, Gmund, and Helmo Stormann-Menninger-Lerchenthal, Linz, all of Austria, assignors to Chemie Linz Aktiengesellschaft, Austria

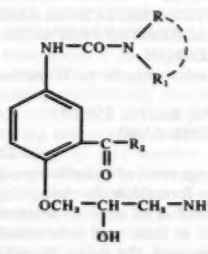
Filed Dec. 17, 1974, Ser. No. 533,688

Claims priority, application Austria, Dec. 20, 1973, 10666/73

Int. Cl.² C07C *127/15, 127/19;* A61K *31/17*

U.S. Cl. 260—553 A **7 Claims**

1. A phenoxypropylamine derivative selected from the group consisting of compounds of the formula



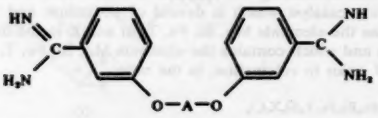
wherein R and R_1 which may be the same or different are an alkyl group containing 1 to 6 carbon atoms, R_2 is an alkyl group containing 1 to 5 carbon atoms and R_3 is tertiary butyl or isopropyl and pharmaceutically acceptable salts thereof.

4,034,010
BIS-(META-AMIDINOPHENOXY)-COMPOUNDS AND PHARMACOLOGICALLY ACCEPTABLE ACID ADDITION SALTS THEREOF

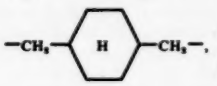
Sachiyuki Hamano, Tokyo; Tamotsu Kanazawa, Tokorozawa, and Shin-ichi Kitamura, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Sept. 22, 1976, Ser. No. 725,673
Claims priority, application Japan, Jan. 13, 1976, 51-2458
Int. Cl.² C07C *123/00*
U.S. Cl. 260—564 R 2 Claims

1. Bis-(meta-amidinophenoxy)-compound having the general formula:



wherein A represents the chain residue



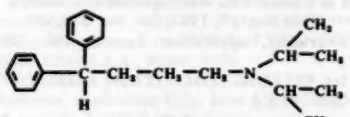
and its pharmacologically acceptable acid addition salts.

4,034,011
1,1-DIPHENYL-4-(SUBSTITUTED-AMINO)BUTANES

Bryan B. Molloy, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 536,284, Dec. 24, 1974, abandoned. This application Mar. 12, 1976, Ser. No. 666,278
Int. Cl.² C07C *87/28*
U.S. Cl. 260—570 R 2 Claims

1. The compound of the formula



and the physiologically tolerable salts thereof.

4,034,012
ACETONE-FORMALDEHYDE-RESORCINOL RESIN COMPOSITIONS AND ADHESIVES PREPARED THEREFROM

M. Frank Gillern, Seattle, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed Mar. 17, 1975, Ser. No. 559,083
Int. Cl.² C08L *61/00*
U.S. Cl. 260—828 43 Claims

1. A liquid, hydrophilic, 2-stage resin composition produced by reaction of (1) an aceton-formaldehyde resin, (2) free formaldehyde, and (3) resorcinol in an aqueous solution at a temperature of at least 50° C. at least until substantially all said free formaldehyde is consumed, the molar quantities of chemically combined acetone, A, and formaldehyde, F_c, in the acetone-formaldehyde resin and the molar quantities of free formaldehyde, F_f, and resorcinol, R, satisfying the equations $F_c/A = 1.5$ to 3.0, $F_f/R = 0.2$ to 1.2 and $R/A = 3.0$ to 5.0.

4,034,013
IMPACT AND MELT STRENGTH IMPROVEMENT OF POLY(ALKYLENE TEREPHTHALATE)

Constance A. Lane, Philadelphia, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed Nov. 13, 1975, Ser. No. 631,761
Int. Cl.² C08L *63/00*
U.S. Cl. 260—835 14 Claims

1. A method of improving the notched Izod impact strength and the melt strength of poly(alkylene terephthalate) comprising blending therewith a multiple stage polymer having a rubbery first stage and an epoxy group-containing hard final stage, and a minimum film forming temperature above about 50° C.

4,034,014
PRODUCTION OF POLYANHYDRIDE EPOXIDE PREPOLYMER COMPOSITIONS

Omer E. Curtis, Jr., Morristown; Harold W. Tuller, Long Valley; Charles T. O'Neill, Dover, and Ralph W. Nussbaum, West Orange, all of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Division of Ser. No. 345,172, March 26, 1973, Pat. No. 3,929,738, which is a division of Ser. No. 81,616, Oct. 16, 1970, Pat. No. 3,732,332. This application Oct. 6, 1975, Ser. No. 619,733
Int. Cl.² C08L *63/00*
U.S. Cl. 260—837 R 18 Claims

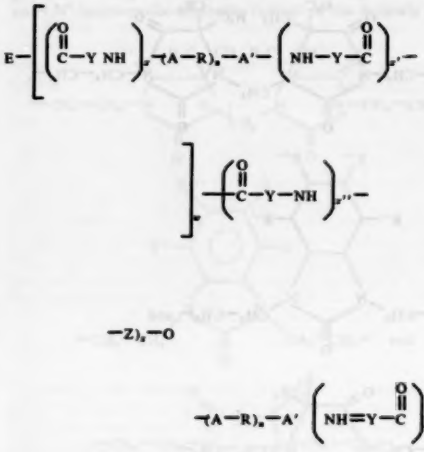
1. A low molecular weight polyanhydride epoxide prepolymer composition obtained by admixing an epoxy compound containing more than 1,2-epoxy group with a polyanhydride in an amount sufficient to provide from about 0.1 to about 1.3 equivalents of epoxy per anhydride equivalent weight, said polyanhydride having a molecular weight below about 1000 and a softening point within the range of about 111° C. to about 156° C. and being the reaction product of the mass polymerization process, in the absence of a polymerization catalyst, of a maleic monomer selected from the group consisting of maleic acid, maleic anhydride, anhydrides which rearrange to maleic anhydrides and the halo-, aryl-, aralkyl-, alkyl-, or cycloalkyl-substituted derivatives thereof and at least one alkyl-substituted styrene in molar proportions of said maleic monomer relative to said alkyl-substituted styrene of greater than 1:1, said polymerization process being effected by heating at least a major portion of the maleic monomer to a temperature of about 160° C. to about 200° C., adding the alkyl-substituted styrene to said maleic monomer, with agitation, at a rate which permits control of the heat of reaction and continuing the polymerization until essentially all of said maleic monomer and alkyl-substituted styrene have polymerized.

4,034,015
ESTER TERMINATED TERPOLYMERS

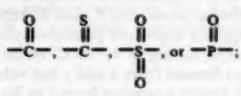
Ross M. Hedrick, Creve Coeur, and James D. Gabbert, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 423,639, Dec. 10, 1973, abandoned. This application Oct. 22, 1974, Ser. No. 516,941
The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.
Int. Cl.² C08L *77/02*
U.S. Cl. 260—857 PG 30 Claims

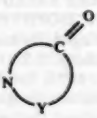
1. A lactam-polyol-polyacyl lactam block terpolymer or a lactam-polyol-acyl polylactam block terpolymer having at least about 5% ester end group termination and the general formula:



wherein $(O-Z)_n$ is a polymeric moiety and Z is a hydrocarbon or substituted hydrocarbon group said group being alkylene, arylene, alkylene carbonyl, arylene carbonyl, and mixtures thereof; A and A′ are acyl groups selected from



R is a divalent hydrocarbon group;
n is an integer equal to zero or one;
E is an amide group of the formula



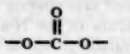
or an ester group of the formula —O—R′ where the —O—R′ is the residual of a monohydric functional alcohol; and
Y is an alkylene or substituted alkylene having from about 3 to about 14 carbon atoms;
R′ is an aliphatic or substituted aliphatic hydrocarbon wherein the ester group is attached to other than a cyclic or aromatic radical:
x, x', x'', and x''' are integers and the total number of x's is equal to $2w + 2$; and z and w are integers equal to one or more.

4,034,016
TERNARY POLYBLENDS PREPARED FROM POLYBUTYLENE TEREPHTHALATES, POLYURETHANES AND AROMATIC POLYCARBONATES

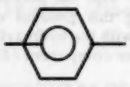
Arthur L. Baron, New Martinsville, W. Va., and John V. Bailey, Pittsburgh, Pa., assignors to Mobay Chemical Corporation, Pittsburgh, Pa.

Filed July 15, 1976, Ser. No. 705,745
Int. Cl.² C08L *75/00*
U.S. Cl. 260—858 **23 Claims**

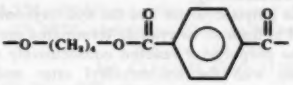
1. A ternary polyblend consisting essentially of an intimate mixture of between about 10 and 40 parts by weight of an aromatic polycarbonate possessing the repetitive carbonate group



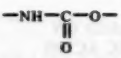
and having the



radical attached to the carbonate group; from about 35 to 60 parts by weight of polybutylene terephthalate composed of recurring structural units of the formula



and from about 20 to 40 parts by weight of a polyurethane that is a reaction product of a diisocyanate, a polyester or polyether and a chain extender characteristically containing the urethane structure



wherein more than about 20 parts by weight of polyurethane are used if more than about 55 parts of polybutylene terephthalate are used.

4,034,017
COMPOSITION USEFUL IN MAKING EXTENSIBLE FILMS

Wen-Hsuan Chang; J. Alden Erikson, and Roger L. Scriven, all of Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 392,584, Aug. 29, 1973, abandoned. This application Apr. 10, 1975, Ser. No. 567,022
Int. Cl.² C08L *75/04*
U.S. Cl. 260—859 R **13 Claims**

1. A method of producing a solvent-soluble coating composition which comprises reacting:
1. from about 1 to 30 percent by weight of a saturated aliphatic or aromatic polyisocyanate;
2. from about 4 to 50 percent by weight of a hydroxyl-containing material selected from the group consisting of saturated aliphatic or aromatic polymeric diols having glass transition temperatures less than 50° C., saturated aliphatic or aromatic low molecular weight diols and mixtures thereof;
3. from about 2 to 20 percent by weight of a hydroxyalkyl ester of an ethylenically unsaturated carboxylic acid;
4. from about 1 to 20 percent by weight of a monomer selected from the group consisting of alkoxymethyl-containing ethylenically unsaturated amides, and ethylenicaly unsaturated blocked isocyanates which are capable of curing said coating composition through hydroxyl functionality of said reaction product and the isocyanate groups of said blocked isocyanates or the N-alkoxymethyl groups of said amide;
5. from about 25 to 90 percent by weight of an ethylenically unsaturated monomer or mixture of monomers diffirent from (3) and (4); the equivalent ratio of isocyanate groups to hydroxyl groups in (1), (2) and (3) being between 1:1.1 and 1:9 so as to obtain an ungelled reaction product and introduce hydroxyl functionality into the reaction product; said coating composition being further

characterized as being essentially free of unreacted NCO groups and ethylenic unsaturaton and said coating compositon being curable through reacton of the N-alkoxymethyl groups or the blocked isocyanate groups at times and temperatures sufficient for these groups to react with the hydroxyl functionality of said reaction product, said reaction being conducted by any of the following steps:

A. reacting the hydroxyalkyl ester with the polyisocyanate and subsequently reacting this product either consecutively or simultaneously with the hydroxyl-containing material and the monomer component (4) and (5);

B. reacting the hydroxyalkyl ester, the hydroxyl-containing material and the polyisocyanate and subsequently reacting this product with the monomer component (4) and (5);

C. reacting all the components (1), (2), (3), (4) and (5) together simultaneously;

D. reacting the polyisocyanate and the hydroxyl-containing material to form an isocyanate-terminated prepolymer and the prepolymer reacted consecutively or simultaneously with the hydroxyalkyl ester and the monomer component (4) and (5).

4,034,018
LINEAR POLYESTERS BASED ON S-TRIAZINEDICARBOXYLIC ACIDS

Jurgen Habermeier, Pfeffingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed July 21, 1975, Ser. No. 597,609

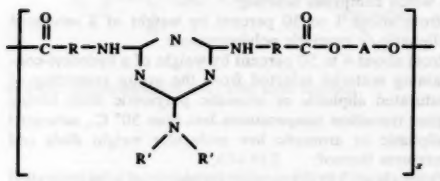
Claims priority, application Switzerland, July 30, 1974, 10477/74

The portion of the term of this patent subsequent to July 5, 1994, has been disclaimed.

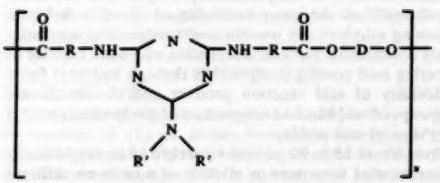
Int. Cl.² C08L 67/02; C08G 63/68

U.S. Cl. 260—860 8 Claims

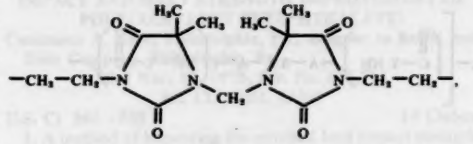
1. A linear, thermoplastic polyester having a relative viscosity of 1.1 to 3.0, measured at 30° C. on a 1% strength solution consisting of equal parts of phenol and tetrachloroethane, characterised by the structural elements of the general formula I

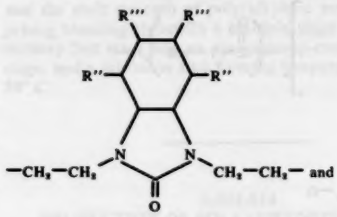


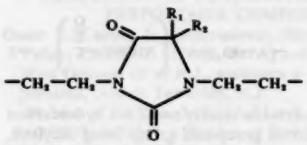
(I)



wherein R denotes an aliphatic radical having 1 to 6 C atoms or the para-phenylene radical, R′ represents methyl, ethyl, phenyl or cyclohexyl, A denotes a diradical selected from the group consisting of







wherein R′′ and R′′′ represent H atoms, chlorine atoms or bromine atoms, or R′′ represents a H atom and R′′′ represents a chlorine or bromine atom, and R_1 and R_2 represents methyl or ethyl, or conjointly represent pentamethylene, D denotes an aliphatic radical having 2 to 10 C atoms, and the mol fraction $(x/x + y)$ formed from x and y has values of 0.1 to 1, and x and y each denote a number from 1 to 30, and y can also be 0.

4,034,019
LINEAR COPOLYESTERS BASED ON TEREPHTHALIC ACID AND/OR ISOPHTHALIC ACID

Jürgen Habermeier, Pfeffingen, Switzerland, assignor to Ciga-Geigy Corporation, Ardsley, N.Y.

Filed July 21, 1975, Ser. No. 597,610

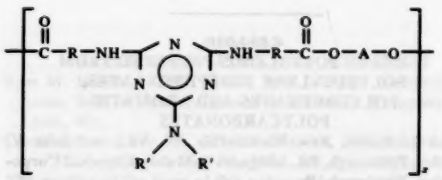
Claims priority, application Switzerland, July 30, 1974, 10476/74

The portion of the term of this patent subsequent to July 5, 1994, has been disclaimed.

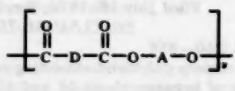
Int. Cl.² C08L 67/02; C08G 63/68

U.S. Cl. 260—860 7 Claims

1. A linear, thermoplastic copolyester having a relative viscosity of 1.1 to 3.0, measured at 30° C on a 1% strength solution consisting of equal parts of phenol and tetrachloroethane, which are characterised by the structural elements of the general formula I

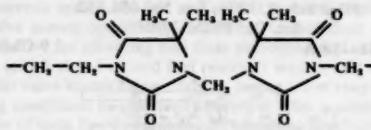


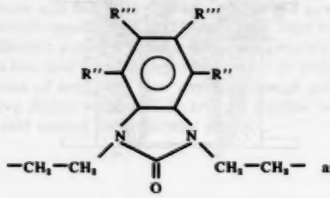
(I)



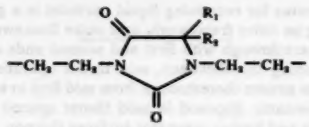
wherein R denotes an aliphatic radical having 1 to 6 C atoms or the para-phenylene radical, R′ represents methyl, ethyl,

phenyl or cyclohexyl, A denotes a diradical selected from the group consisting of an aliphatic radical having 2 to 10 atoms, an N,N′-heterocyclic-aliphatic radical of the formula





and



wherein R″ and R‴ represent H atoms, chlorine atoms or bromine atoms, or R″ represents an H atom and R‴ represents a chlorine or bromine atom, and R_1 and R_2 represent methyl or ethyl or conjointly represent pentamethylene, D denotes the meta- or para-phenylene radical and the mol fraction

$$\frac{x}{x+y}$$

formed from x and y has values of 0.01 to 0.99, x and y each denoting a number from 1 to 30.

4,034,020
GRAFT COPOLYMER PREPARATION

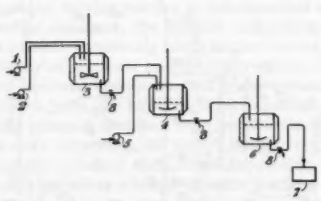
John David Moore, and Ian Robert Wheeler, both of Southampton, England, assignors to The International Synthetic Rubber Company, Limited, Southampton, England

Continuation of Ser. No. 269,022, July 5, 1972, abandoned. This application Feb. 12, 1976, Ser. No. 657,631

Claims priority, application United Kingdom, July 6, 1971, 31622/71

Int. Cl.² C08F 279/04

U.S. Cl. 260—880 R **7 Claims**



1. A process for preparing a graft copolymer comprising admixing one or more vinyl aromatic monomers and one or more unsaturated nitrile monomers with a latex of a rubbery polymer selected from polybutadiene and butadiene-styrene copolymer, characterised by imbibing the mixture for a period of 30 to 50 minutes at a temperature of from 20° to 90° C under continuous flow conditions continuously supplying the imbibed mixture to a first stirred reactor, at a temperature (T1) of 70° to 90° C, initiating emulsion graft polymerisation in the presence of a free radical initiator in said first stirred reactor and continuing the polymerisation to effect conversion of 40 to 65% by weight of the monomers at a rate not more than 5% per minute, continuously removing the reaction mixture from said first stirred reactor and supplying it to a second stirred reactor, at a temperature equal to or above T1 but not over 100° C and further continuing the graft polymerisation in the second stirred reactor whereby to convert at least 80% by weight of the monomers to polymer.

4,034,021
COPOLYMERS OF PIVALOLACTONE AND ISOPRENE OR BUTADIENE

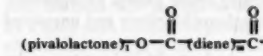
Robert Paul Foss, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 413,367, Nov. 6, 1973, Pat. No. 3,907,933, which is a division of Ser. No. 324,502, Jan. 17, 1973, Pat. No. 3,821,331, which is a continuation-in-part of Ser. No. 227,258, Feb. 17, 1972, abandoned. This application June 25, 1975, Ser. No. 590,371

Int. Cl.² C08L 9/00, 13/00

U.S. Cl. 260—887 **9 Claims**

1. A copolymer derived from pivalolactone and a diene selected from the group consisting of isoprene and butadiene, said copolymer being of the formula



(A)

wherein l and n are about 5 to 4,000 and m is about 25 to 25,000, and wherein the molecular weights of the polypivalolactone segments are about 500 to 400,000 and the molecualr weights of the polydiene segments are about 1300 to 1,700,000, said copolymer being further characterized by having a melt index of zero at 180° C and at least 2.0 at 250° C.

4,034,022
PHOSPHORIC ESTERS OF POLYFLUORINATED ALCOHOLS, AND THEIR PREPARATION

Michel Demarcq, and Joseph Sleziona, both of Lyon, France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

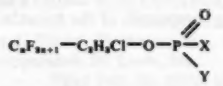
Filed Dec. 9, 1971, Ser. No. 206,512

Claims priority, application France, Dec. 9, 1970, 70.44290

Int. Cl.² C07F 9/09, 9/12, 9/14, 9/24

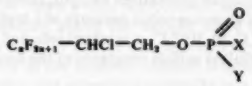
U.S. Cl. 260—955 **9 Claims**

1. Phosphoric esters of polyfluorinated alcohols consisting essentially of at least one isomer of phosphoric esters of polyfluorinated alcohols, said esters corresponding to the general formula:

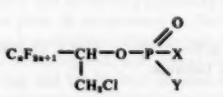


(I)

said two isomers corresponding to formulae (II) and (III):



(II)



(III)

wherein C_nF_{2n+1} is a perfluorinated aliphatic chain, n is an

integer from 2 to 18, X and Y are the same or different and are each a halogen atom; a hydroxyl radical; the group OM in which M is a metallic equivalent; an alkoxy, chloroalkoxy, hydroxypolyalkyleneoxy, or an aryloxy group; or the group —NZZ′ in which Z and Z′ are the same or different and are each a hydrogen atom or an alkyl, cycloalkyl, or aryl group.

4,034,023

PROCESS FOR PREPARING MIXED PHOSPHATE ESTER COMPOSITIONS

Donald Hardy, Sr., Yardley, and Edward Francis Orwoll, Langhorne, both of Pa., assignors to FMC Corporation, Philadelphia, Pa.

Filed May 5, 1975, Ser. No. 574,588
Int. Cl.² C07F 9/11, 9/12
U.S. Cl. 260—973 **5 Claims**

1. A process for preparing a mixed phosphate ester composition consisting essentially of 10% to 19% tributyl phosphate, 62% to 80% dibutyl phenyl phosphate, and 10% to 19% butyl diphenyl phosphate, which comprises:

a. reacting phosphorus oxychloride with phenol in a molar ratio 1:0.8 to 1.0 at a temperature of about 40° to about 100° C until less than 1% unreacted phenol is present in the reaction mixture while moving liberated hydrogen chloride from the reaction mixture to prepare a first reaction product comprising crude phenyl phosphorodichloridate, diphenyl phosphorochloridate and unreacted phosphorus oxychloride;

b. reacting the first reaction product with at least two moles of n-butanol per replaceable chloride under agitation at a temperature below 35° C for a sufficient time to prepare a second reaction product comprising crude tributyl phosphate, dibutyl phenyl phosphate, and butyl diphenyl phosphate; and

c. purifying the second reactiomn product by removing acid esters, acidic impurities, salts unreacted n-butanol from the second reaction product thereby leaving a substantially pure mixed phosphate ester composition consisting essentially of 10% to 19% tributyl phosphate, 62% to 80% dibutyl phenyl phosphate, and 10% to 19% butyl diphenyl phosphate.

4,034,024

METHOD OF PREPARING TRIALKYL TETRATHIOPHOSPHATES

Arthur D. F. Toy, Stamford, Conn., and Eugene H. Uhing, Ridgewood, N.J., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 514,525, Oct. 15, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,488
Int. Cl.² C07F 9/17, 9/177
U.S. Cl. 260—981 **5 Claims**

1. A method of preparing compounds of the formula:

$$(R^1S)_x(R^2S)_yP(S) \qquad (I)$$

wherein $x + y = 3$; R^1 and R^2 are the same or different and are selected from the group consisting of $C_1$14 C_{18} straight-chain or branched alkyl and cycloalkyl of 5 to 6 carbons in the ring and the C_1-C_4 alkyl substituted derivatives thereof; comprising contacting under at least an autogenous pressure at a temperature of from about 150° C. to 300° C. a reactant selected from the group consisting of dialkyl sulfide reactants of the formula:

$$R^1SR^2 \text{ TM II}$$

wherein R^1 and R^2 are as defined above with a phosphorus pentasulfide reactant of the formula:

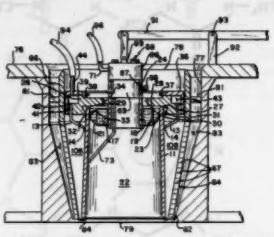
$$P_2S_{10}.$$

4,034,025

ULTRASONIC GAS STREAM LIQUID ENTRAINMENT APPARATUS

John G. Martner, 49 James Ave., Atherton, Calif. 94025

Filed Feb. 9, 1976, Ser. No. 656,532
Int. Cl.² F02M 27/08
U.S. Cl. 261—18 A **9 Claims**



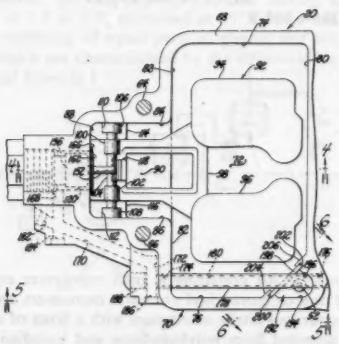
1. Apparatus for entraining liquid particles in a gas stream, comprising an outer framework, said outer framework having a throat therethrough with first and second ends and throat walls extending therebetween, said throat operating to conduct the gas stream therethrough from said first to said second ends, a resonator disposed in said throat spaced from said throat walls and having resonator surfaces thereon, means for driving said resonator to assume a resonant vibratory condition, a clamp engaging one end of said resonator for positioning thereof in said throat, means for delivering a liquid to contact a surface on said resonator, and a diffuser disposed in spaced relations with said resonator surface and forming boundaries of a chamber therewith, said diffuser operating to direct the gas stream into said chamber toward said surface at a first velocity, said resonator operating to atomize the liquid and urge it from said surface into said chamber at a second velocity which is lower than and substantially in opposition to said first velocity, so that the atomized liquid is prevented from passing through said diffuser and is mixed with the gas stream and entrained therein.

4,034,026

MULTI-FUNCTION FLUID INLET VALVING MEANS AND RESERVOIR MEANS

Robert J. Miller, Warren, Mich., assignor to Colt Industries Operating Corporation, New York, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,117
Int. Cl.² F02M 5/02
U.S. Cl. 261—23 A **4 Claims**



1. A fuel supply system for a carburetor for an internal combustion engine having main combustion chamber means and precombustion chamber means, said fuel supply system comprising first fuel reservoir means effective for supplying

fuel to said combustion chamber means, second fuel reservoir means effective for supplying fuel to said precombustion chamber means, float means situated in said first reservoir means and responsive to the level of the fuel within said first reservoir means and first and second series arranged fuel inlet valve means operatively connected to said float means and effective for admitting fuel from associated fuel source means to said first and second fuel reservoir means, said second fuel inlet valve means being effective during a first range of operating conditions to effectively divert at least a substantial portion of such fuel flow passing through said first fuel inlet valve means from said first fuel reservoir means and to said second fuel reservoir means, and said second fuel inlet valve means being effective during a second range of operating conditions to admit into said first fuel reservoir means at least a substantial portion of such fuel flow passing through said first fuel inlet valve means while still diverting a portion of such fuel flow to said second fuel reservoir means.

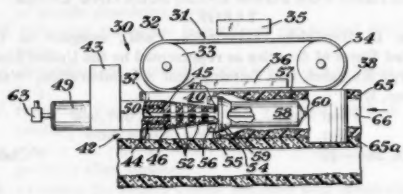
4,034,027
METHOD FOR SPIRAL DEPOSITION OF AN INTEGRALLY BONDED HOLLOW FOAMED SYNTHETIC RESIN STRIP

Hubert Stacy Smith, Jr., Bay City, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 487,073, July 10, 1974, abandoned, which is a continuation of Ser. No. 302,840, Nov. 1, 1972, abandoned. This application Nov. 24, 1975, Ser. No. 634,997

Int. Cl.² B29D *27/04*

U.S. Cl. 264—32 **2 Claims**



1. In a method for the deposition of a hollow strip of a hardened foamed synthetic resinous material from a foam depositing head moving relative to the deposited strip to prepare a walled structure, the method comprising depositing into a peripherally restraining configuration having a generally rectangular cross sectional configuration a foamable hardenable liquid synthetic resinous material which cures to form a foamed plastic body, the material being deposited in a generally radially outward direction from a centrally disposed depositing means, permitting the resinous material to foam and harden to form a hollow foam strip, disposed in a generally helical or spiral manner wherein adjacent portions of the strip are integrally bonded, the material being progressively deposited until a desired structure is achieved, the improvement which comprises

rotating a mandrel on said depositing means within the central region adjacent said deposited resinous material during at least the initial portion of the foaming, curing and hardening of said material, at least a portion of said material contacting the mandrel thereby providing a passageway of generally uniform cross section within the deposited strip.

4,034,028
VARIABLE VENTURI CARBURETOR

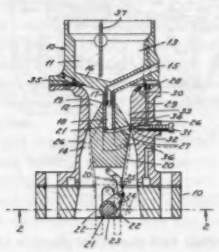
Thomas Tsoi-Hei Ma, Romford, England, assignor to Ford Motor Company, Dearborn, Mich.

Filed Jan. 26, 1976, Ser. No. 652,487

Claims priority, application United Kingdom, Mar. 14, 1975, 10693/75

Int. Cl.² F02M *9/14*

U.S. Cl. 261—41 R **5 Claims**



1. A variable venturi carburetor having an induction passage communicating with ambient air at one end and adapted to be connected to an engine inlet manifold at the opposite end, the induction passage having a fixed area venturi defined by a fixed area choke, the passage converging upstream of the choke and diverging downstream of the choke, a main fuel passage extending into the induction passage and communicating with a fuel discharge tube which extends axially along the choke, an elongated throttle body supported at its upstream end by engagement with the fuel tube for a sliding movement in the induction passage, a throttle control device arranged for supporting the downstream end of the throttle body for a sliding movement and for displacing the throttle body between an idle speed position and a full throttle position downstream of the idle speed position, the throttle body having a divergent portion merging into a convergent portion, the throttle body in its idle speed position closely fitting the induction passage, displacement of the throttle body towards the full throttle position opening a variable throat between the widest part of the throttle body and the divergent portion of the induction passage, the throttle body having internal passages connecting the fuel tube to the widest part of the throttle body for discharge of fuel into the variable throat, the fuel tube being formed with a number of openings in its wall, the openings being just below the exit of the main fuel passage and communicating with the fixed choke flow area, the openings being sufficiently large that the pressure in the fixed choke flow area determines the flow of fuel in the main fuel passage.

4,034,029
METERING ROD CONTROL FOR AN AIR VALVE CARBURETOR

Larry J. Tipton, Florissant, Mo., assignor to ACF Industries, Incorporated, St. Louis, Mo.

Filed July 19, 1976, Ser. No. 706,511

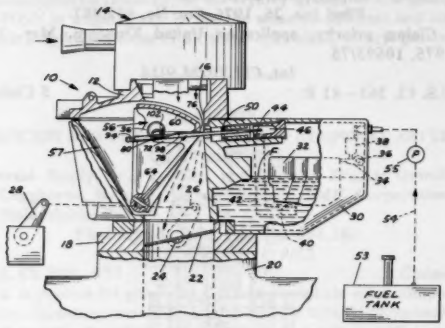
Int. Cl.² F02M *9/06*

U.S. Cl. 261—44 R **7 Claims**

1. In a carburetor having an air and fuel mixture conduit, a throttle valve within the conduit, an air valve mounted across the conduit above the throttle valve and pivoted adjacent its lower end for movement between open and closed positions relative to the mixture conduit, a metering rod carried by the air valve and extending generally in a horizontal direction, an orifice plate in an opening in the wall of the mixture conduit having a metering orifice therein receiving the extending end of the metering rod, and means on the air valve mounting the metering rod for limited pivoted movement;

the improvement comprising a torsion spring engaging the metering rod to urge the metering rod into contact with

the side of the orifice, said torsion spring including two portions thereof which have different spring rates, one portion continuously urging the metering rod against the



side of the orifice and the other portion urging the metering rod against the side of the orifice after the air valve has been at least partially opened.

4,034,030

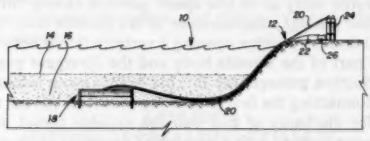
OXYGENATION IMPREGNATION APPARATUS

Jep T. Bracey, Shepherd, Tex., assignor to Martin L. Towler, Galveston, Tex.

Continuation of Ser. No. 420,214, Nov. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 385,056, Aug. 2, 1973, Pat. No. 3,903,636, which is a continuation of Ser. No. 202,839, Nov. 29, 1971, abandoned. This application Sept. 10, 1975, Ser. No. 611,907

Int. Cl.² B01F *3/04*

U.S. Cl. 261—64 D **2 Claims**



1. An apparatus for dissolving oxygen within a body of water comprising:

receptacle means immersed in said water for containing a volume of oxygen in quiescent surface contact with said water, said receptacle means comprises a top wall, a lip extending from the periphery of said wall, said lip extending downward, and transverse to said top wall to form an open bottom chamber,

means for introducing oxygen within a region of said receptacle means containing said volume of oxygen, said region bounded by said top wall, said lip extending downward from the periphery of said top wall, and the surface of said water underlying said volume of oxygen, thereby supplying oxygen directly to said volume of oxygen and maintaining the quiescent surface contact of said volume of oxygen with said water,

float valve means disposed subjacent said top wall for supplying oxygen to said receptacle means at a rate equal to the rate oxygen is absorbed by the water underlying the receptacle means and thereby maintaining a predetermined volume of oxygen in said receptacle means and in substantially quiescent surface contact with the underlying water,

said oxygen not exhausting from said receptacle means other than by absorption into the underlying water, and said top wall including a plurality of ribs equally spaced across said top wall for stiffening said wall.

4,034,031

METHOD OF MANUFACTURING GRID ELECTRODES FOR ELECTRON TUBES

Bernhard Lersmacher, Aachen; Horst Seifert, Hamburg, both of Germany, and Johannes Wilhelmus Antonius Krol, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 16, 1975, Ser. No. 622,999

Claims priority, application Germany, Oct. 23, 1974, 2450261

Int. Cl.² B29C *17/08*; B23K *9/00*

U.S. Cl. 264—25 **8 Claims**

1. A method of manufacturing grid electrodes for electron tubes, in which pyrolytic graphite is deposited by thermal decomposition of carbon-containing gases on a mandril having a smooth surface and the resulting molded body is separated from the mandril and provided with grid-like apertures, characterized in that the molded body after the formation of the grid is covered again with a thin layer of pyrolytic graphite and that the steps of deposition on the mandril and the covering again of the molded body having grid-like apertures are carried out at a temperature of the carbon-containing gas that is higher than the temperature of the mandril and of the molded body, respectively.

4,034,032

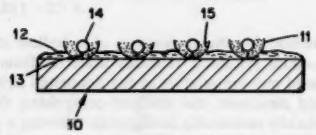
METHOD FOR FOAM ENCAPSULATING LASER TARGETS

Charles D. Hendricks, Livermore, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 2, 1975, Ser. No. 609,640

Int. Cl.² B29D *27/04*; C01B *4/00*

U.S. Cl. 264—28 **7 Claims**



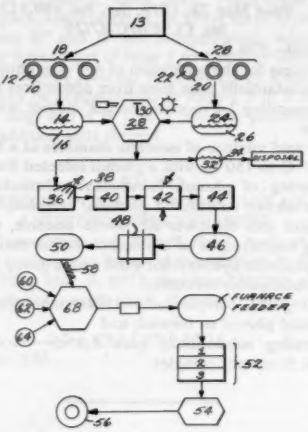
1. A method for encapsulating a quantity of fusion fuel in a foam having a density of about 0.065 to 0.6 × 10^3 kg/m^3, a thickness of about 10 to 100 μm, and a cell size of up to about 2 μm comprising the steps of: positioning a fusion fuel-containing member having a cross-section of about 40 to 100 μm in a mold cavity formed in a desired configuration, filling the mold cavity with a solution comprising cellulose acetate and at least a swelling agent, placing the thus filled mold cavity in a bath of water having a temperature of 0°–10° C causing the solution to gel, soaking the gel in a water bath to extract additives therefrom, freezing the thus soaked gel, freeze-drying the thus frozen gel such that water and solvents therein sublime and the gel structure solidifies into a low density microcellular foam containing the fusion fuel therein, and removing the thus formed fuel containing foam from the mold cavity.

4,034,033

METHOD FOR RECOVERING MATERIAL FROM THE CENTERS OF PHONOGRAPH RECORDS

Ricardo Haro Carrere, Lima, Peru, assignor to Fredrick M. Kerr, Miami, Fla.

Filed Mar. 26, 1976, Ser. No. 670,903
Int. Cl.² B29D 17/00
U.S. Cl. 264—36 17 Claims



1. A method for recovering the center portions of phonograph records carrying paper labels comprising the steps of:
   a. soaking a first batch of record center portions in a plastic dissolving liquid,
   b. simultaneously introducing a second batch of record center portions into a container of plastic dissolving solution,
   c. removing the record center portions from the container of plastic dissolving liquid,
   d. removing the paper labels from the record center portions,
   e. depositing the removed paper labels in a suitable depository,
   f. repeating the steps (c-e) for the second batch of record center portions,
   g. rinsing the record center portions and drying the same portions after rinsing,
   h. crushing the record center portions into relatively small particles,
   i. sieving the record center portions according to size, and
   j. passing the sieved particles through an electromagnet.

4,034,034

PROCESS FOR MELT-SPINNING FILAMENTS FROM NOZZLES COATED WITH STABILIZED SILICONE OIL

Wiprecht Eberius, Kreuzau, and Herbert Lorenz, Laudenbach, both of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Filed Oct. 15, 1974, Ser. No. 515,049
Claims priority, application Germany, Oct. 15, 1973, 2351668
Int. Cl.² D01D 1/10
U.S. Cl. 264—39 5 Claims

1. In a process for melt-spinning a synthetic linear fiber-forming polymer at temperatures of at least about 270° C. into filaments by extrusion through a nozzle treated on its discharge face with a thin layer silicone oil coating, the improvement of using a silicone oil coating stabilized with a small stabilizing amount of a cerium compound consisting essentially of the reaction product of cerium acetylacetonate and a polymethylsiloxane containing reactive hydrogen atoms.

4,034,035

METHOD OF PREPARING MULTI-TONED TABLETS

Joseph B. Schwartz, Hatfield, and Frederick A. Restaino, Hatboro, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed July 14, 1975, Ser. No. 595,645
Int. Cl.² B29C 9/00
U.S. Cl. 264—77 3 Claims

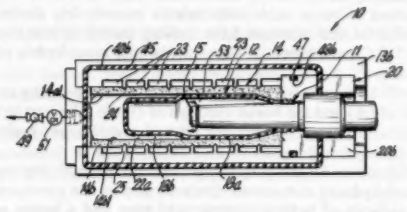
1. A process for preparing multi-toned compressed tablet dosage form which comprises:
   a. blending to a uniform admixture a therapeutically effective quantity of an orally administerable medicament together with an excipient mixture of microcrystalline cellulose and modified corn starch having a cold water soluble content in excess of 10 percent to form a dry mass for granulation;
   b. adding to said dry mass with continual mixing a granulation solution having dissolved therein a water soluble pharmaceutically acceptable dye until the thus wetted mass has achieved the proper consistency suitable for granulation and wherein the dye has been more strongly attracted to the starch excipient than to the cellulose excipient;
   c. drying the wetted mass;
   d. milling the dried mass so produced to obtain granules having a particle size between about 30 to about 325 mesh;
   e. compressing the dried granules so obtained to the desired tablet shape and size to form multi-toned compressed tablet dosage forms.

4,034,036

PARISON CONTROL IN LONGITUDINAL STRETCH

John Jerome Farrell, Greenbrook, N.J., assignor to Consupak, Inc., Morristown, N.J.

Filed Oct. 31, 1975, Ser. No. 627,602
Int. Cl.² B29C 17/07
U.S. Cl. 264—89 7 Claims



1. A method for controlling the thickness of a parison comprising: providing a fluid on the inside of the parison to expand the parison in the longitudinal direction while exerting a vacuum on a first portion of the outside of the parison to hold that first portion from further longitudinal extension and exerting a fluid cushion on another portion of the outside of the parison to permit longitudinal extension of that another portion so as to control the thickness of the parison as it undergoes longitudinal expansion prior to blow molding.

4,034,037

CARBOXYLATION METALLATION PROCESS

Robert Kenneth Jordan, The Carlton House, Suite 1431, 550 Grant St., Pittsburgh, Pa. 15219

Filed Jan. 14, 1974, Ser. No. 433,296
Int. Cl.² C07F 3/08
U.S. Cl. 260—429 R 22 Claims

1. The compound of the formula $(R)(NR'CO_2)_cM_d$ where R is selected from alkylene containing 1 to 50 carbon atoms and arylene, R' is selected from the group consisting of hydrogen,

alkyl and aryl, M is a metal having a valence of 1,2 or 3, *c* is from 2 to 5 and *d* is from two-thirds to 5.

7. A process for the production of metal carboxylates comprising combining an ammonium salt of a carboxylic acid and a metal salt of an acid in an inert solvent in an equivalent ratio of from about 0.1:1 to about 10:1 at a temperature in the range of from about −80° C to about 400° C.

15. A process for the production of metal N-organic substituted carbamates comprising an ammonium salt of an N-organic substituted carbamic acid and a metal salt of an acid an an inert solvent in an equivalent ratio for from about 0.1:1 to about 10:1 at a temperature in the range of from about −80° C to about 400° C.

4,034,038
BORON-CONTAINING ESTERS

Paul W. Vogel, Lyndhurst, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 885,265, Dec. 15, 1969, abandoned, which is a continuation-in-part of Ser. No. 800,367, Feb. 12, 1969, abandoned, which is a continuation of Ser. No. 323,266, Nov. 13, 1963, abandoned. This application June 19, 1972, Ser. No. 264,094

Int. Cl.² C07F *5/04*

U.S. Cl. 260—462 R **11 Claims**

1. A process for the preparation of boron-containing esters of a polyhydroxy compound chracterized by the presence of ester radicals of both a succinic acid type and a boron acid type which comprises the esterification of one mole of a polyhydroxy compound having the formula $R(OH)_x$, wherein R represents a hydrocarbon radical and *x* is an integer having a value of from 2 to about 10, with

A. at least about 0.5 mole of a hydrocarbon-substituted succinic acid-producing compound selected from the group consisting of the acid, acid halides, esters, and acid anhydrides, wherein the hydrocarbon substituent has at least about fifty aliphatic carbon atoms; and

B. at least about one mole of a boron-containing reactant selected from the group consisting of boron oxide, boron halides, boron acids, ammonium salts of boron acids, esters of boron acids with volatile monohydric alcohols, wherein the alcohols have boiling points below about 150° C., and esters of boron acids with monohydric phenols;

wherein the total amount of the succinic acid-producing compound of (A) and the boron reactant of (B) to take part in the esterification reaction does not exceed *x* moles per mole of polyhydroxy compound.

6. A process for the preparation of boron-containing esters of a polyhydroxy compound characterized by the presence of ester radicals of both a succinic acid type and a boron acid type which comprises the steps of

1. the partial esterification at a reaction temperature above 100° C. of a polyhydroxy compound corresponding to the formula $R(OH)_x$, wherein R represents a hydrocarbon radical, and *x* is an integer having a value of from 2 to about 10, with

A. at least about 0.5 mole of a hydrocarbon-substituted succinic acid-producing compound selected from the group consisting of the acid, acid halides, esters, and anhydrides, wherein the hydrocarbon substituent has at least about fifty carbon atoms;

and

2. the esterification of the intermediate product of step (1) at a temperature above about 100° C., with

B. at least about one mole of a boron-containing reactant selected from the group consisting of boron oxide, boron halides, boron acids, ammonium salts of boron acids, esters of boron acids with volatile monohydric alcohols, wherein the alcohols have boiling points below about 150° C., and esters of boron acids with monohydric phenols;

wherein the total amount of the succinic acid-producing compound (A) and the boron-containing reactant (B) to take part in the esterification reaction does not exceed *x* moles per mole of polyhydroxy compound.

4,034,039
PURIFICATION OF METHYLENEDIANILINES

Kwok K. Sun, Hamden, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed May 28, 1976, Ser. No. 690,913

Int. Cl.² C07C *87/20*

U.S. Cl. 260—570 D **11 Claims**

1. A process for the separation of 4,4′-diaminodiphenylmethane in substantially pure form from admixtures thereof with the corresponding 2,4′-isomer and 2,2′-isomer, which process comprises:

heating said mixture of isomeric diamines at a temperature of 30° C to 150° C with a phenol selected from the class consisting of phenol, lower-alkyl substituted phenols, lower-alkoxy substituted phenols, catechol, orcinol, resorcinol and bis-lower-alkylidene phenols, said phenol being employed in an amount such that there is at least one phenolic hydroxyl for each amine group in said 4,4′-diaminodiphenylmethane;

separating the complex of 4,4′-diaminodiphenylmethane and said phenol so formed; and

regenerating substantially pure 4,4′-diaminodiphenylmethane from said complex.

4,034,040
XYLENE-DIAMINES AS ANTIVIRAL AGENTS

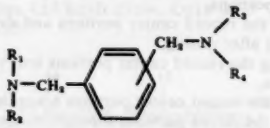
Timothy H. Cronin, Niantic; Hermann Faubl; William W. Hoffman, both of Mystic, and James J. Korst, Old Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 541,240, Jan. 15, 1975, abandoned, which is a division of Ser. No. 330,042, Feb. 6, 1973, Pat. No. 3,872,171, which is a continuation-in-part of Ser. No. 146,548, May 24, 1971, abandoned, which is a continuation-in-part of Ser. No. 62,192, Aug. 7, 1970, abandoned. This application Mar. 14, 1975, Ser. No. 558,224

Int. Cl.² C07C *87/28*

U.S. Cl. 260—570.9 **17 Claims**

1. A compound of the structure



or a non-toxic acid addition salt thereof wherein

R_1 is alkyl of from 1 to 20 carbon atoms;

R_2 is alkyl of from 12 to 20 carbon atoms;

R_3 is selected from the group consisting of hydrogen and hydroxyalkyl of from 2 to 89 carbon atoms; and

R_4 is selected from the group consisting of hydrogen, alkyl of from 1 to 8 carbon atoms and hydroxyalkyl of from 2 to 8 carbon atoms.

4,034,041
1,3-BRIDGED AMINO TETRALINS

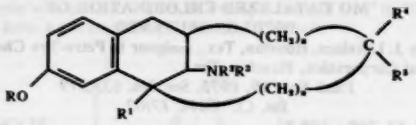
Meier E. Freed, Paoli, and John R. Potoski, Spring City, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,021

Int. Cl.² C07C *87/64*

U.S. Cl. 260—571 **4 Claims**

1. A compound of the formula:



wherein R is hydrogen, lower alkyl, phen(lower)alkyl, or substituted phen(lower)alkyl, R^1 is lower alkyl of from 1 to 4 carbon atoms; R^2 and R^3 are independently selected from hydrogen, or lower alkyl of from 1 to 4 carbon atoms; R^4 and R^5 are independently selected from the group lower alkyl, or R^4 and R^5 may be concatenated to form a 5 or 6 membered carbocyclic ring; and n is 1 or 2 and the pharmaceutically acceptable addition salts thereof.

4,034,042
PROCESS FOR THE PRODUCTION OF 4-NITROSO-DIPHENYLAMINE

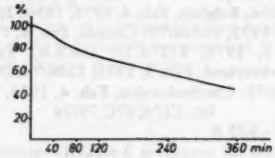
Karlfried Wedemeyer, and Rudolf Helm, both of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Mar. 5, 1973, Ser. No. 338,219

Claims priority, application Germany, Mar. 9, 1972, 2211341

Int. Cl.² C07C *87/28*

U.S. Cl. 260—576 **6 Claims**



1. In the process of producing 4-nitrosodiphenylamine wherein N-nitrosodiphenylamine is subjected to rearrangement in an alcoholic hydrogen chloride solution and 4-nitrosodiphenylamine is recovered, the improved method of preventing spontaneous decomposition of 4-nitrosodiphenylamine hydrochloride which comprises regulating the ratio of hydrogen chloride to N-nitrosodiphenylamine in said solution, the rearrangement reaction temperature and the rearrangement reaction time in such a way that the resulting 4-nitrosodiphenylamine hydrochloride is prevented from crystallizing out and remains in solution during said rearrangement, and then neutralizing said 4-nitrosodiphenylamine hydrochloride and recovering resulting 4-nitrosodiphenylamine, there being up to 20 mols of hydrogen chloride used per mole of N-nitrosodiphenylamine reactant, said reaction temperature being in the range of from 0° to 65° C. and said reaction time being up to 4 hours.

4,034,043
ALCOHOLIC HYDROLYSIS OF 2-FORMYLAMINOCHLOROTOLUENE

Alfred Grieder, Muttenz, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 13, 1976, Ser. No. 648,847

Int. Cl.² C07C *87/50*

U.S. Cl. 260—578 **6 Claims**

1. Process for the production of 2-amino-5-chlorotoluene hydrochloride by chlorination of 2-formylaminotoluene, subsequent splitting-off of the formyl group of the formed 2-formylaminochlorotoluenes, and separation of 2-amino-5-chlorotoluene as hydrochloride, in which process the 2-formylamino-5-chlorotoluene, formed on chlorination of 2-formylaminotoluene in an inert organic solvent, in the reaction mixture obtained on chlorination is split by reaction with methanol into methyl formate and 2-amino-5-chlorotoluene; and the last-mentioned is separated as hydrochloride.

4,034,044
MENTHONE-8-THIOL, CARVOMENTHONE-8-THIOL AND PROCESS FOR PREPARING SAME

Erling Sundt, Pinchat-Geneva, and Günther Ohloff, Bernex, Geneva, both of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

Continuation of Ser. No. 13,755, Feb. 24, 1970, Pat. No. 3,598,643. This application Apr. 30, 1973, Ser. No. 355,470

Claims priority, application Switzerland, Feb. 27, 1969, 2928/69; Nov. 3, 1969, 16374/69

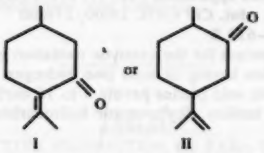
Int. Cl.² C07C *49/31*, *45/00*

U.S. Cl. 260—586 R **4 Claims**

1. Substantially pure menthone-8-thiol having a b.p. of 57° C./0.01 Torr.

2. Carvomenthone-8-thiol.

3. A process for the preparation of menthone-8-thiol or carvomenthone-8-thiol respectively, which comprises condensing H_2S with a monoolefinic ketone of the formula



I II

respectively, in which reaction the stoichiometric ratio of the formula I or II compound to the H_2S is such as to result in a reaction product substantially comprising menthone-8-thiol or carvomenthone-8-thiol, wherein the reaction is carried out at a temperature of from −80° C to room temperature.

4,034,045
2,4-DISUBSTITUTED-4b,5,6,7,8,8a,9,10-OCTAHYDRO-9-OXO-PHENANTHRENES

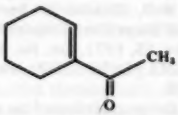
Sandor Barcza, West Orange, N.J., and James B. Hendrickson, Cambridge, Mass., assignors to Sandoz, Inc., E. Hanover, N.J.

Continuation-in-part of Ser. No. 566,759, April 10, 1975, abandoned, which is a continuation of Ser. No. 368,939, June 11, 1973, abandoned. This application Dec. 4, 1975, Ser. No. 637,718

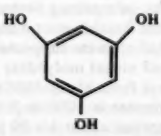
Int. Cl.² C07C *49/82*

U.S. Cl. 260—590 FB **3 Claims**

1. A process for preparing 2,4 dihydroxy 4*b*,5,6,7,8,8*a*,9,10-octahydro-9-oxo-phenanthrene which comprises treating a compound of the formula



with a compound of the formula



under an inert atmosphere in the presence of a strong base and alcoholic solvent at a temperature of between 50° and 150° C.

4,034,046
HYDROXYARYLDIALKYL SULFONIUM HALIDES

Vincent Lamberti, Upper Saddle River, and Mark D. Konort, Haworth, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Feb. 9, 1971, Ser. No. 114,034
Int. Cl.² C07C *149/46*
U.S. Cl. 260—607 B 5 Claims

1. (4-hydroxyphenyl)n-dodecylmethyl sulfonium bromide.

4,034,047
PROCESS FOR CATALYTIC OXIDATION OF OLEFINS TO FORM HYDROPEROXIDES

Howard P. Angstadt, Media, Pa., assignor to Suntech, Inc., St. Davids, Pa.

Division of Ser. No. 524,912, Nov. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 853,547, Aug. 27, 1969, abandoned. This application Feb. 17, 1976, Ser. No. 656,055
Int. Cl.² C07C *29/00, 179/00*
U.S. Cl. 260—610 B 13 Claims

1. In the process for the catalytic oxidation of aliphatic or alicyclic olefins having at least one hydrogen atom on the α-carbon atom, said olefins having 3 to 18 carbon atoms, or secondary or tertiary alkylaromatic hydrocarbons of the formula

wherein R is lower alkyl; R_1 is lower alkyl or hydrogen; and Ar is an aromatic nucleus selected from the group consisting of phenyl and naphthyl, in the presence of air or oxygen at a temperature of from about 80° to 200° C to form hydroperoxides, the decomposition products thereof, or mixtures of the same, the improvement wherein the catalyst is a polymeric complex formed from a thermally condensed polyacrylonitrile and a transition metal salt, wherein said transition metal is from Group IB, IIB, IIIB, IVB, VB, VIB, VIIB, VIIIB, or IIA of the Periodic Table and wherein the ratio of said catalyst to said olefin or alkylaromatic hydrocarbon is from about 0.01 to 5.0 parts by weight of catalyst per 100 parts by weight of olefin or alkylaromatic hydrocarbon.

4,034,048
TAR ACID PRODUCTS FROM SOLVENT NAPHTHA

Norman S. Boodman, Penn Hills Township, Allegheny County, and Richard C. Weil, Monroeville Borough, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Nov. 15, 1971, Ser. No. 198,967
Int. Cl.² C07C *37/32, 39/02*
U.S. Cl. 260—621 H 6 Claims

1. A process for the preparation of tar acids from the solvent naphtha fraction having a boiling point in the range of about 160° – 200° C obtained from the carbonization of bituminous coal, said fraction containing coumarone as the major heterocyclic ingredient, comprising destructively hydrogenating the solvent naphtha fraction over a catalyst selected from the group consisting of alumina-supported cobalt molybdate and alumina-supported nickel molybdate wherein

a. the temperature is from about 300° C to about 500° C,
b. the hydrogen pressure is 1000 to 3000 psig, and
c. the catalyst comprises about 1 – 20 percent by weight of the solvent naphtha fraction.

4,034,049
MO CATALYZED CHLORINATION OF DICHLOROBUTENES

Billy J. Lovelace, Houston, Tex., assignor to Petro-Tex Chemical Corporation, Houston, Tex.

Filed Nov. 19, 1975, Ser. No. 633,379
Int. Cl.² C07C *17/02*
U.S. Cl. 260—658 R 22 Claims

1. In a process for the production of meso-1,2,3,4-tetrachlorobutane by contacting in a reaction zone trans-1,4-dichlorobutene-2 in the liquid phase with chlorine at a temperature of from about 25° C. to about 150° C. in the substantial absence of oxygen, the improvement which comprises:

effecting said contacting of trans-1,4-dichlorobutene-2 and chlorine in the presence of a catalytic amount of molybdenum.

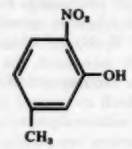
8. The process to claim 1 wherein nitric oxide is added to the reaction zone in an amount of from about 0.1 to about 20 mol precent based on trans-1,4-dichlorobutene-2.

4,034,050
PREPARATION OF 5-METHYL-2-NITROPHENOL

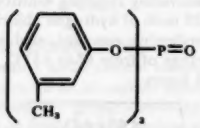
Mitsuru Sasaki, and Kunio Mukai, both of Nishinomiya, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 547,090, Feb. 4, 1975, abandoned. This application Dec. 17, 1975, Ser. No. 641,585
Claims priority, application United Kingdom, Jan. 31, 1975, 4428/75; Germany, Feb. 4, 1975, 2504592; France, Feb. 3, 1975, 75.03304; Belgium, Feb. 4, 1975, 153032; United Kingdom, Feb. 4, 1975, 01314/75; Canada, Feb. 4, 1975, 219387; Italy, Feb. 3, 1975, 67270/75; U.S.S.R., Feb. 3, 1975, 2103873; Switzerland, Feb. 3, 1975, 1240/75; Denmark, Feb. 3, 1975, 360/75; Czechoslovakia, Feb. 4, 1975, 725/75
Int. Cl.² C07C *79/24*
U.S. Cl. 260—622 R 7 Claims

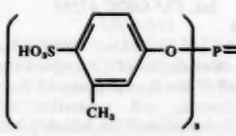
1. A process for preparing 5-methyl-2-nitrophenol of the formula



which comprises treating tri-m-cresyl phosphate of the formula

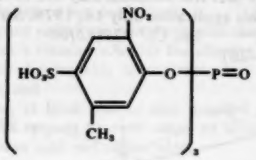


with a sulfonating agent selected from the group consisting of sulfuric acid and fuming sulfuric acid, at a temperature of 25° to 150° C., to form a sulfonated compound of the formula



nitrating the sulfonated compound with a nitrating agent selected from the group consisting of nitric acid, fuming nitric

acid, a mixture of nitric acid and sulfuric acid and a mixture of acetic acid and nitric acid, at a temperature of −15° to 20° C., to form a nitrated compound of the formula



and hydrolyzing the nitrated compound at a temperature of 110° to 170° C. in the presence of an acid selected from the group consisting of sulfuric acid, phosphoric acid, concentrated hydrochloric acid and a mixture of at least two of said acids.

4,034,051
STABILIZATION OF PERCHLOROETHYLENE

Dominik Dempf, Mehring; Otto Fruhwirth, Burghausen, and Ludwig Schmidhammer, Haiming, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Sept. 18, 1975, Ser. No. 614,547

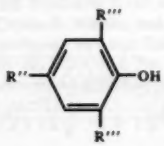
Claims priority, application Germany, Oct. 18, 1974, 2449667

Int. Cl.² C07C *17/40, 17/42*

U.S. Cl. 260—652.5 R **10 Claims**

1. A stable mixture of perchloroethylene containing a mixture of from 0.001% to 0.01% by weight of at least one N-alkylmorpholine having the formula

wherein R′ is alkyl having from 1 to 5 carbon atoms, R is alkyl having from 1 to 5 carbon atoms and n is an integer from 0 to 3, and from about 0.001% to 0.01% by weight of at least one alkylphenol having the formula



wherein R″ and R‴ are members selected from the group consisting of hydrogen and alkyl having from 1 to 18 carbon atoms, with the proviso that at least one of R″ and R‴ is alkyl having from 1 to 18 carbon atoms.

4,034,052
ALKENYLATION CATALYSTS

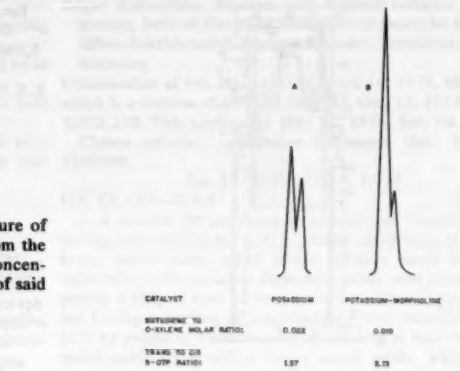
Imre Puskas, Glen Ellyn, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sept. 29, 1975, Ser. No. 617,368

Int. Cl.² C07C *3/00*

U.S. Cl. 260—671 C **19 Claims**

1. In a process for alkenylation of alkylaromatics having benzylic hydrogen with conjugated diolefins of 4–15 carbon atoms in the presence of an alkali metal selected from the group consisting of potassium, rubidium, cesium, and alloys of said metals with each other or with other alkali metals, the improvement comprising carrying out the process in the presence of a cocatalyst selected from the group consisting of unsaturated amines having 1–60 carbon atoms, primary and secondary saturated amines having 1–60 carbon atoms,



N,N,N′,N′-tetramethylethylenediamine, N,N,N′N′-tetramethyl-1,3-propanediamine, and ammonia.

4,034,053
SELECTIVE PRODUCTION OF PARA-XYLENE

Warren W. Kaeding, Westfield, and Lewis B. Young, Kendall Park, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,861

Int. Cl.² C07C *3/62, 15/08*

U.S. Cl. 260—672 T **7 Claims**

1. A process for the selective production of para-xylene which comprises contacting toluene, under disproportionation conditions, with a catalyst consisting essentially of a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, said catalyst having combined therewith magnesium in an amount of at least about 0.5 percent by weight, as a result of contact of said zeolite with a magnesium compound in the liquid phase, cooling the resulting product and separating para-xylene therefrom.

4,034,054
PROCESS FOR THERMOFORMING HOLLOW ARTICLES

Donald G. Sauer, Harwinton, Conn., assignor to National Can Corporation, Chicago, Ill.

Filed Sept. 20, 1974, Ser. No. 507,788

Int. Cl.² B29C *17/04;* **B29F** *5/00*

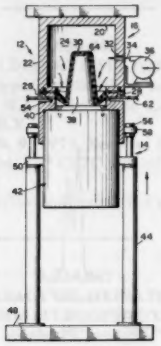
U.S. Cl. 264—93 **1 Claim**

1. In a process for thermoforming a hollow plastic article from a sheet of heated thermoplastic material over a male mold contained to a desired internal shape of said article, wherein said sheet of thermoplastic material is firmly held between a pressure box assembly and a male mold assembly including said male mold, the improvement comprising:

a. closing an entrance to a chamber of said pressure box by disposing a resilient diaphragm of elastomeric material across said entrance, between said sheet and said entrance;

b. stretching and forming said sheet by moving and pressing said male mold against a side of said sheet opposite said diaphragm, said moving including passing said male mold through a plane originally occupied by said diaphragm so

that said resilient diaphragm causes said sheet to be drawn about said male mold, and maintaining chamber at



a positive pressure with a compressible fluid during said stretching and forming.

4,034,055

TUBULAR FILM OF POLYETHYLENE TEREPHTHALATE AND PROCESS FOR THE PRODUCTION THEREOF

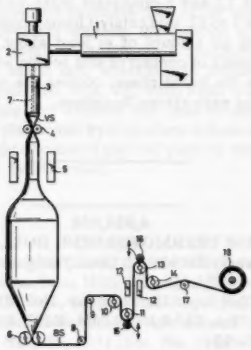
Hans Strutzel, Wiesbaden; Detlef Gneuss, Marktredwitz, and Ludwig Klenk, Hallgarten, all of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Division of Ser. No. 501,628, Aug. 29, 1974. This application Mar. 18, 1975, Ser. No. 559,405

Claims priority, application Germany, Aug. 30, 1973, 2343698

Int. Cl.² B29D 7/24; B29C 17/02

U.S. Cl. 264—95 **5 Claims**



1. In the process for the production of tubular films of polyethylene terephthalate by biaxial stretching in the range of the second order transition point of an extruded, amorphous tubular film, subsequent longitudinal stretching at temperatures between the second order transition point and the melting temperature range, and cooling,

the improvement comprising performing the biaxial stretching at a stretching ratio of 3.3 to 4.2 in the longitudinal direction and 4.0 to 4.7 in the transverse direction at a tube temperature of 84° to 86° C, collapsing the tube into a lay flat film without a gas cushion, and performing the longitudinal after-stretching at a stretching ratio of 1.05 to 2.5 and at a tube temperature of 148° to 152° C.

4,034,056

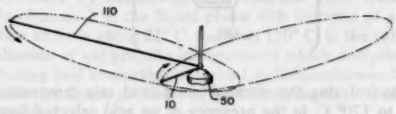
METHOD OF MAKING SLIDE FASTENER COILS

George B. Moertel, Conneautville, Pa., assignor to Textron, Inc., Providence, R.I.

Division of Ser. No. 380,323, July 18, 1973, Pat. No. 3,906,595. This application July 16, 1975, Ser. No. 596,109

Int. Cl.² B29D 5/00

U.S. Cl. 264—281 **7 Claims**



1. A method of forming a pair of coils for a slide fastener device comprising the steps of

supplying a pair of continuous filaments having generally elliptical cross sections to a shaping station,

winding the filaments at the shaping station in opposite directions to form a pair of intermeshed coils,

shaping each convolution of each coil into four components including a bight element, first and second links extending from said bight element and a connector member extending from the first link of one convolution to the second link of an adjacent convolution, and

continuously changing the geometry of each convolution as it is being shaped by reorienting the major axis of its cross section whereby the first links are asymmetrically arranged relative to the second links.

4,034,057

METHOD OF SHAPING A BELL END ON THERMOPLASTIC PIPE

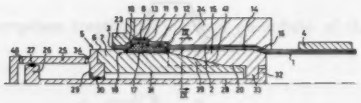
Petrus Marinus Acda, Enkhuizen, Netherlands, assignor to Polva-Nederland B.V., Enkhuizen, Netherlands

Division of Ser. No. 581,707, May 28, 1975, Pat. No. 3,998,578, which is a continuation of Ser. No. 408,562, Oct. 23, 1973, abandoned. This application Jan. 15, 1976, Ser. No. 649,480

Claims priority, application Netherlands, Apr. 5, 1973, 7304761

Int. Cl.² B29C 1/12

U.S. Cl. 264—297 **2 Claims**



1. A method of shaping a bell end on a pipe of thermoplastic material, the opening of the bell end having a diameter which is smaller than the maximum diameter of the inner surface of the bell end and substantially equal to the outer diameter of the pipe, by axially inserting a cylindrical shaping mandril into a pre-heated pipe end, said mandril comprising a base part having a diameter equal to the diameter of said opening, comprising the sequential steps of:

radially expanding an elastic shaping ring onto said base part from a relaxed state having an outside diameter at the most equal to said base part diameter to an operative position having a diameter equal to said maximum diameter;

restraining said shaping ring against axial movement with respect to said base part;

moving at least one of said mandril and said pipe axially with respect to each other so as to insert said mandril into an end of the pipe;

causing a bell end portion of the pipe to deform inwardly so

as to form a bell end having an opening whose diameter is smaller than said maximum diameter;

cooling said pipe such that the shape formed about the mandril will be retained;

continuing said restraining step while said moving, causing and cooling steps are performed;

forming a space radially inward from said shaping ring so as to establish a clearance under the shaping ring;

allowing said shaping ring to contract elastically into said clearance; and

lastly moving at least one of said mandril and said pipe axially with respect to each other so as to remove said mandril from said end of the pipe.

4,034,058

METHOD FOR PRODUCING SYNTHETIC SODIUM ALUMINOSILICATE ION-EXCHANGE MATERIAL FROM CALCINED KAOLIN CLAY

M. Phillip Jameson, and Fred R. Huege, both of Somerville, N.J., assignors to Engelhard Minerals & Chemicals Corporation, Edison, N.J.

Filed June 29, 1976, Ser. No. 700,862
Int. Cl.² C01B *33/28*
U.S. Cl. 423—118 **6 Claims**

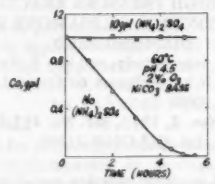
2. In a process for producing finely divided particles of a synthetic crystalline sodium aluminosilicate zeolite by heating an aqueous alkaline reaction mixture consisting essentially of oxides of aluminum, silicon and sodium, the major portion of said aluminum and silicon oxides being provided by the inclusion in the reaction mixture of finely divided particles of metakaolin until finely divided zeolite crystals form, separating the zeolite crystals from the reaction liquid and washing the crystals, which process results in a zeolite product having a brightness substantially less than the brightness of the clay used to produce said metakaolin reactant, the improvement whereby the zeolite product will have a substantially higher brightness, which comprises removing iron-bearing impurities from the metakaolin by volatilizing the impurities with a chlorine-bearing gas at a temperature in the range of 600° to 980° C. before including the metakaolin in the aqueous alkaline reaction mixture used to produce the zeolite.

4,034,059

SEPARATION OF COBALT FROM NICKEL BY OZONATION IN THE PRESENCE OF AMMONIUM SALTS

Franklin F. Clark; Cvetko B. Nikolic, and Paul B. Queneau, all of Golden, Colo., assignors to Amax Inc., Greenwich, Conn.

Filed July 19, 1976, Ser. No. 706,817
Int. Cl.² C01G *51/04*
U.S. Cl. 423—144 **7 Claims**



1. A method of separating cobalt from a nickel solution containing cobalt in the cobaltous state and at least about 0.1 grams/liter of ammonium ion, the nickel to cobalt ratio in solution being at least about 5:1, which comprises,

subjecting said solution to ozonation while controlling the pH thereof from about 4.5 to 6 by the addition of a base other than ammonium hydroxide, and continuing said ozonation in said pH range until said cobalt has been oxidized to the cobaltic state and precipitated as a cobaltic hydrate at a temperature of at least about 10° C.

4,034,060

EXHAUST GAS PURIFYING CATALYST AND PROCESS OF MAKING AND USING SAME

Edgar Koberstein, Alzenau, and Eduard Lakatos, Grossenhausen, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Continuation of Ser. No. 567,776, April 14, 1975, abandoned, which is a division of Ser. No. 406,075, Oct. 12, 1973, Pat. No. 3,928,238. This application May 13, 1976, Ser. No. 685,958
Claims priority, application Germany, Oct. 13, 1972, 2250200
Int. Cl.² C01B *21/20, 31/18*
U.S. Cl. 423—213.5 **15 Claims**

1. A process for purifying an exhaust gas comprising contacting said exhaust gas with a catalyst comprising at least one heavy metal oxide, alkali metal, alkaline earth metal and optionally noble metal or aluminum oxide, said catalyst comprising a shaped core of temperature-resistant support material having a coating of catalytically active material, at least 50% by weight of the active material being at least one heavy metal oxide or modified heavy metal oxide, wherein said heavy metal is selected from the group consisting of copper, chromium, nickel, titanium, vanadium, manganese, iron, cobalt, zinc, tin, molybdenum, tungsten and bismuth; said support material and catalytically active material being in a weight ratio of about 4 – 30 : 1 and being without substantial mutual permeation due to said core having been intensively mixed with a binding agent until the surface of said core is slightly glutinous and thereafter having been intensively mixed with a pulverulent catalytically active material or with a hydroxyl group-containing precursor of the catalytically active material and the resulting mass having been heated to remove the binding agent.

4,034,061

ALUMINUM BORATE CATALYST COMPOSITIONS AND USE THEREOF IN CHEMICAL CONVERSIONS

Dennis P. McArthur, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation of Ser. No. 307,031, Nov. 16, 1972, abandoned. This application June 30, 1975, Ser. No. 591,352
The portion of the term of this patent subsequent to Dec. 24, 1991, has been disclaimed.
Int. Cl.² B01D *53/34*
U.S. Cl. 423—213.5 **11 Claims**

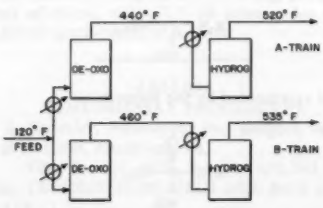
11. A process as defined in claim 1 wherein said shaped aggregate is in the form of a membranous coating supported on an inert monolithic structure traversed by channels of about 1/32 –¼ inch in diameter.

4,034,062

REMOVAL OF OXYGEN FROM GAS STREAM WITH COPPER CATALYST

Bruno O. Krueger, Columbus, Ohio, assignor to Borden, Inc., Columbus, Ohio

Filed Mar. 20, 1975, Ser. No. 560,551
Int. Cl.² B01D *53/34*
U.S. Cl. 423—219 **10 Claims**



1. Process for the purification of a gas stream containing

primarily hydrogen and carbon monoxide as well as small quantities of oxygen, acetylene, and ethylene as impurities, comprising passing said gas stream at a temperature of 250° to 700° F through a bed of catalyst consisting essentially of a copper catalyst for removal of substantially all of acetylene and oxygen and at least about 60% ethylene.

4,034,063
PROCESS FOR CONTROL OF SO_x EMISSIONS FROM COPPER SMELTER OPERATIONS

Edward C. Rosar, Lakewood, Colo.; Jacques M. Dulin, Libertyville, Ill.; Joseph M. Genco, Gahanna, and Harvey S. Rosenberg, Columbus, both of Ohio, assignors to Industrial Resources, Inc., Chicago, Ill.

Filed Mar. 22, 1974, Ser. No. 453,582

The portion of the term of this patent subsequent to Apr. 8, 1992, has been disclaimed.

Int. Cl.² C01B *17/00;* **B01J** *8/60;* **C01G** *3/00;* **C22B** *11/00*

U.S. Cl. 423—244 **10 Claims**

1. A process for control of SO_x off-gases from a copper smelter having copper ore in situ heap or dump leaching and cement copper operations requiring sulfuric acid-containing leach liquor, and said cement copper operation producing a barren, with respect to copper values, liquor rich in ferrous ions, comprising the steps of:

a. contacting a smelter off-gas with a sodium alkali sorbent to form a sodium sulfur oxide salt waste,

b. removing ferrous ions from said barren liquor by reacting said liquor with said sodium sulfur oxide salt waste,

c. maintaining said reaction at a temperature in the range of from about 50° to 300° F and a pH below about 5.5 a time sufficient to form: (19 a substantially water insoluble double salt selected from natrojarosite, sideronatrite, metasideronatrite, depegite, rosarite, iriite and mixtures thereof, and (2) an iron-stripped leach liquor having reduced levels of ferrous iron and being substantially free of said sulfur oxide salt waste, and

d. passing said iron-stripped leach liquor to said ore leaching operation for in situ leaching of copper values from said copper ore,

thereby controlling SO_x emissions, disposing of water-soluble SO_x emissions control wastes, and providing a leach liquor low in ferrous ion values which assists in reducing the amount of leach operation plugging contributed by leach liquor ferrous iron.

4,034,064
HYDROGEN PEROXIDE STABILIZATION WITH TRIAMIDES OF PHOSPHORUS

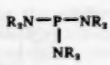
James A. Cook, Jr., Barberton, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 2, 1976, Ser. No. 654,312

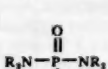
Int. Cl.² C01B *15/02*

U.S. Cl. 423—272 **12 Claims**

1. A stabilized aqueous hydrogen peroxide solution having dissolved therein a minor stabilizing concentration, sufficient to retard decomposition of hydrogen peroxide induced by polyvalent metal cation contamination, of a phosphorus compound selected from the group consisting of compounds represented by the formula:



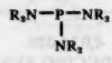
compounds represented by the formula



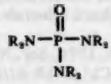
and mixtures thereof, wherein (a) each R independently is an alkyl group having 1 to 6 carbons, (b) the two R on a particular nitrogen may be joined, optionally through an oxygen, to form a ring together with the nitrogen, and (c) the total number of carbons in all R is from 6 to 20.

7. A method of stabilizing aqueous hydrogen peroxide, which comprises:

adding to aqueous hydrogen peroxide solution a minor stabilizing amount, sufficient to retard decomposition of hydrogen peroxide induced by polyvalent metal cation contamination, of a soluble phosphorus compound selected from the group consisting of compounds represented by the formula:



compounds represented by the formula



and mixtures thereof, wherein (a) each R independently is an alkyl group having 1 to 6 carbons, (b) the two R on a particular nitrogen may be joined, optionally through an oxygen, to form a ring together with the nitrogen, and (c) the total number of carbons in all R is from 6 to 20.

4,034,065
PREPARATION OF CU+ ZEOLITES

Paul Haruo Kasai, White Plains; James Nelson Francis, Peekskill, and Roland Justin Bishop, Jr., Hauppauge, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Sept. 26, 1975, Ser. No. 617,083

Int. Cl.² C01B *33/28*

U.S. Cl. 423—328 **3 Claims**

1. Process for preparing zeolites containing Cu^+ cations which comprises providing a crystalline zeolite having pore diameters of at least 4 Angstroms, having a framework SiO_2. /Al_2O_3 molar ratio of from 15 to 200 and containing bivalent copper cations, contacting and reacting said zeolite as a reagent with water at a temperature of from 200° C. up to the crystal destruction temperature of the zeolite, said zeolite reagent containing insufficient water of hydration to stabilize the bivalent copper cations thereof against reaction with said water.

4,034,066
METHOD AND HIGH PRESSURE REACTION VESSEL FOR QUALITY CONTROL OF DIAMOND GROWTH ON DIAMOND SEED

Herbert M. Strong, Schenectady, and Roy E. Tuft, Guilderland Center, both of N.Y., assignors to General Electric Company, Columbus, Ohio

Filed Nov. 2, 1973, Ser. No. 412,425

Int. Cl.² C01B *31/06*

U.S. Cl. 423—446 **23 Claims**

1. In a diamond synthesis reaction vessel for introduction into the reaction volume of a high pressure, high temperature apparatus, said reaction vessel constituting an assembly of interfitting elements for enclosing diamond seed material and a source of substantially pure carbon, said diamond seed material and source of carbon being separated by a mass of metallic catalyst-solvent material for the diamond-making reaction disposed therebetween so as to provide a predetermined temperature gradient between said diamond seed material and said source of carbon under operating conditions of pressure and temperature in the diamond stable region of the phase diagram of carbon, said diamond seed material and said

source of carbon being located in separate regions of said reaction vessel such that under said operating conditions said diamond seed material will be heated to a temperature near the minimum value of temperature for said temperature gradient and simultaneously said source of carbon will be heated to a temperature near the maximum value of temperature for said temperature gradient, the combination with said interfitting elements of

a. metallic means for isolating said diamond seed material from contact with said catalyst- solvent material for a preselected period of time under operating conditions of pressure and temperature,

b. means for suppressing diamond nucleation,

c. said isolating means and said nucleation suppressing

means being in separate layers; said isolating means, said nucleation suppressing means and said mass of catalyst-solvent material being of different materials in any given reaction vessel construction, said isolating means being made of a material having a melting point, when in contact with diamond, that is higher than the melting point of said catalyst-solvent material saturated with carbon dissolved therein, when in contact with diamond,

d. said isolating layer being in contact with said diamond seed material and being disposed between the said diamond seed material and said mass of catalyst-solvent material and

e. said nucleation suppressing layer being disposed in contact with the underside of said mass of catalyst-solvent material.

4,034,067

HYDROXYCHLORIDES OF ALUMINUM AND METHOD

Laurent Seigneurin, Salindres, and Michel Brunet, Rousson, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Continuation-in-part of Ser. No. 514,623, Oct. 15, 1974, abandoned. This application May 17, 1976, Ser. No. 687,019

Claims priority, application France, Oct. 16, 1973, 73.36846; June 26, 1974, 74.2201; July 2, 1974, 74.22968

Int. Cl.² C01B *7/00*

U.S. Cl. 423—462 **7 Claims**

1. A method for preparing products consisting essentially of aluminum hydroxychlorides in homogeneous solution in which the aluminum hydroxychlorides have the general formula $Al_2(OH)_xCl_{6-x}$ in which X is a value of 3 to more than 5 but less than 6, comprising heating an aqueous solution of activated alumina to a temperature of 60° F to reflux temperature with vigorous agitation in the presence of a compound selected from the group consisting of aluminum chloride, hydrochloric acid and mixtures thereof for reaction to provide said aluminum hydroxychloride in homogeneous solution, the activated alumina consisting of the product of the partial dehydration of hydrates of alumina in a stream of hot gases to less than 2 moles combined water and a specific surface area of at least 200 m^2/g.

4,034,068

PROCESS FOR PREPARATION OF AMMONIUM TETRAFLUOROALUMINATE

Minoru Aramaki, and Etsuo Ushirogouchi, both of Ube, Japan, assignors to Central Glass Co., Ltd., Ube, Japan

Filed Oct. 24, 1975, Ser. No. 625,476

Claims priority, application Japan, Oct. 28, 1974, 49-123467

Int. Cl.² C01F *7/50;* **C01C** *1/16, 1/18*

U.S. Cl. 423—465 **10 Claims**

1. A process for the preparation of ammonium tetrafluoroaluminate comprising the steps of:

a. preparing an aqueous slurry of ammonium hexafluoroaluminate and an aluminum compound selected from the group consisting of aluminum hydroxide and aluminum oxide, the molar ratio of said ammonium hexafluoroaluminate to said aluminum compound being about 1:1/2;

b. adding an inorganic acid selected from the group consisting of sulfuric acid, hydrochloric acid and nitric acid to said slurry in such an amount that the molar ratio of said ammonium hexafluoroaluminate to said inorganic acid in the resulting mixture is about 4:3 for sulfuric acid, and about 2:3 for hydrochloric acid and nitric acid, leaving an excess amount of the acid necessary to neutralize free ammonia which may be present in said slurry; the resultant reaction system being kept at a temperature between room temperature and about 100° C. at atmospheric pressure; and

c. recovering the ammonium tetrafluoroaluminate product from the reaction system in crystalline form by filtration.

4,034,069

METHOD OF PREPARING ARSENIC TRIFLUORIDE

M. David Curtis, Ann Arbor, MI, assignor to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,044

Int. Cl.² C01B *27/00*

U.S. Cl. 423—489 **9 Claims**

1. A process for the production of arsenic trifluoride which comprises reacting arsenic trichloride with at least one molten fluoride salt selected from the group consisting of alkali metal fluorides, alkaline earth metal fluorides and mixtures thereof in the presence of at least one molten chloride salt.

4,034,070

PROCESS FOR PREPARING ANHYDROUS METAL FLUORIDES

John A. Wojtowicz, and David F. Gavin, both of Cheshire, Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 597,546, July 21, 1975, abandoned. This application Sept. 22, 1976, Ser. No. 725,898

Int. Cl.² C01B *7/08;* **C01F** *5/28;* **C01G** *1/06, 43/06*

U.S. Cl. 423—489 **10 Claims**

1. A process for preparing anhydrous metal fluoride which comprises reacting, in the presence of a nitrile having 2–4 carbon atoms, a metal with HF and halogen, both in substantially anhydrous form, said halogen being selected from the group consisting of chlorine, bromine, iodine and a mixture thereof, the reaction being carried out using, per every gram-equivalent of metal, about 0.1–50 gram-moles of HF and about 0.05–25 gram-moles of halogen.

4,034,071

IMMUNOASSAY PROCEDURES

Herbert S. Strickler, Pittsburgh, Pa., assignor to Allegheny General Hospital, Pittsburgh, Pa.

Filed Jan. 26, 1976, Ser. No. 652,302

Int. Cl.² G01N *33/00;* **G21H** *5/02;* **B01J** *1/22*

U.S. Cl. 424—1 **14 Claims**

1. In an immunoassay procedure, including the step of separating within a mixture a bound untagged substance and a

bound tagged same substance from unbound substance and unbound tagged same substance by selectively absorbing the unbound portions, the improvement comprising subjecting said mixture to a clathrate compound having a host substance and an inclusion substance to carry out the separation, wherein a sorbent is the host substance.

9. In an automated system for performing immunoassays in which a bound untagged substance and a bound tagged same substance are separated from unbound substance and unbound tagged same substance within a mixture by selectively absorbing the unbound portions, the improvement comprising:

A. adding to the mixture to be separated a clathrate charcoal;

B. mixing the clatherated charcoal and the mixture; and

C. continuously filtering to obtain the bound untagged substance and bound tagged same substance as a filtrate.

4,034,072
SERUM HEPATITIS TEST

Shirley A. Mjos, Millis, and Roger N. Piasio, Medfield, both of Mass., assignors to Corning Glass Works, Corning, N.Y.

Filed July 21, 1975, Ser. No. 597,359

Int. Cl.² G01N *33/00*; A61K *39/00*; G21H *5/02*

U.S. Cl. 424—1 **14 Claims**

1. A method of detecting the presence of hepatitis associated antigen in an unknown serum sample, the method comprising the steps of:

a. incubating the serum sample with a reagent comprising anti-hepatitis associated antigen antibodies covalently bonded via an intermediate silane coupling agent to a plurality of essentially siliceous particles having a surface area of at least about 1 m^2/g and, if porous, an average pore diameter of at least about 1000 A, the incubation being under conditions sufficient to allow complexation of any hepatitis associated antigen in the sample with the anti-hepatitis associated antigen antibodies of the reagent;

b. separating the reagent from the incubation medium of step (a);

c. incubation the separated reagent with a solution of radio labelled anti-hepatitis associated antigen antibodies under conditions sufficient to complex the labelled antibodies with any hepatitis associated antigen complexed to the antibodies of the reagent;

d. separating the reaction products of step (c) from the solution; and

e. measuring the radioactivity of the separated products or the remaining solution to determine whether hepatitis associated antigen was present in the serum sample.

4,034,073
COMPOSITE FOR BIASED SOLID PHASE RADIOIMMUNOASSAY OF TRIIODOTHYRONINE AND THYROXINE

Howard H. Weetall, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Mar. 28, 1975, Ser. No. 563,102

Int. Cl.² G01N *33/00, 33/16*

U.S. Cl. 424—1 **4 Claims**

1. A reagent useful for a solid phase radioimmunoassay of triiodothyronine comprising an aqueous suspension of an immunochemical composite consisting of a saturating amount of radioactively labelled triiodothyronine complexed to a sub-composite consisting of anti-triiodothyronine antibodies covalently coupled via an intermediate silane coupling agent to suspenable particles of porous glass.

4,034,074
UNIVERSAL REAGENT 2-SITE IMMUNORADIOMETRIC ASSAY USING LABELLED ANTI(IgG)

Laughton E. M. Miles, Stanford, Calif., assignor to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed Sept. 19, 1974, Ser. No. 507,347

Int. Cl.² G01N *33/00*; G21H *5/02*; A61B *10/00*

U.S. Cl. 424—1 **3 Claims**

1. The process of making an immunoradiometric quantitative assay of an unknown quantity of a known antigen of a first animal species comprising the steps of:

a. preparing an antibody to the antigen of the first animal species in a second animal species,

b. causing said antibody to be bound to a reaction site,

c. reacting and binding said known antigen with said bound antibody,

d. preparing an antibody to said known antigen in a third animal species and reacting and binding the same with the bound known antigen of paragraph c,

e. preparing a purified, radioactive labeled antibody to the immunoglobulin of said third animal species in said second animal species and reacting and binding the same with the bound material of paragraph d,

f. removing unreacted material from said reaction site, and

g. measuring the radioactivity of the bound material to determine the quantity of the known antigen.

4,034,075
QUINALDIC ACID DERIVATIVES

David Edmund Bays; Mervyn Evan Peel; David Martin Waters, all of London, and Gwynn Pennant Ellis, Rhiwbina, all of England, assignors to Allen & Hanburys Limited, London, England

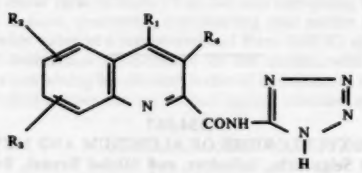
Division of Ser. No. 372,027, June 21, 1973, Pat. No. 3,932,416. This application Aug. 15, 1975, Ser. No. 605,036

Claims priority, application United Kingdom, July 3, 1972, 30990/72

Int. Cl.² C07D *413/14*; A61K *31/47*

U.S. Cl. 424—45 **12 Claims**

1. A compound of the formula:



in which R_1, R_2 and R_3 independently represent a hydrogen atom, alkyl, nitro, a halogen atom or $-NR_4R_5$ or $-OR_4$; in which R_4 and R_5 may be the same or different and each represent a hydrogen atom, or an alkyl, alkenyl or cycloalkyl group which alkyl group may optionally be substituted by alkoxy, hydroxy, formyloxy, amino, alkylamino, dialkylamino; or R_4 and R_5 together with the nitrogen atom form morpholino, piperazinyl or N-methyl piperazinyl; and R_6 represents a hydrogen atom or alkyl; or a pharmaceutically acceptable salt thereof; any alkyl moiety being of 1 to 6 carbon atoms; any alkenyl moiety being of 2 to 6 carbon atoms, any cycloalkyl moiety being of 5 or 6 carbon atoms, R_2 and R_3 when both are vicinal and other than a hydrogen atom, said substituents are methyl; and at least one of R_1, R_2 and R_3 is $-NR_4R_5$ forming morpholino, piperazinyl or N-methyl piperazinyl.

9. A method of treating a condition due to the combination of extrinsic antigen with a reaginic antibody in which the condition is extrinsic asthma, hay fever, urticaria, eczema or atopic dermatitis which comprises administering by oral ingestion or inhalation an effective amount of a compound as claimed in claim 1.

4,034,076

PROCESS FOR MAKING TOOTHPASTE

James Coulson, Bracknell, England, and Malcolm Richard Nearn, Ingleburn, Australia, assignors to Lever Brothers Company, New York, N.Y.

Filed Mar. 3, 1975, Ser. No. 554,880
Claims priority, application United Kingdom, Mar. 7, 1974, 10303/74
Int. Cl.² A61K 7/16
U.S. Cl. 424—49 4 Claims

1. Process for inhibiting the swelling of aluminum toothpaste tubes containing a toothpaste composition comprising from about 20 percent to about 60 percent by weight of an alumina trihydrate having an average particle size of from about 3 to about 30 microns, in which process there is incorporated in the toothpaste composition a silica sol of which the silica particles are negatively charged in an amount of at least about 0.001 percent, calculated as silica by weight of the toothpaste, effective to stabilise the toothpaste against gassing of the aluminum tubes.

4,034,077

OINTMENTS AND POWDERS CONTAINING SEBACIC ACID

John Anthony Hill, New Brunswick; Irwin A. Katz, East Brunswick, and John H. Murphy, Toms River, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jan. 2, 1973, Ser. No. 320,042
Int. Cl.² A61K 7/035
U.S. Cl. 424—69 11 Claims

1. A powder composition comprising in parts by weight from about 2 to about 30% sebacic acid, from about 45 to about 97% talc, and from about 0.1 to about 2% hydrophobic silicon dioxide.

4,034,078

PRODUCT AND METHOD FOR CONTROLLING ODORS

Earl Thomas Van Horn, Manchester, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Continuation of Ser. No. 115,788, Feb. 16, 1971, abandoned. This application Sept. 22, 1975, Ser. No. 615,616
Int. Cl.² A61K 37/48; A61L 13/00
U.S. Cl. 424—76 7 Claims

1. A method for the abatement of noxious odors emanating from an odoriferous substance comprising: treating said substance with an effective amount of a mixture which comprises a substantially proteolytic enzyme in an amount by weight of said mixture sufficient to yield an enzymatic activity of about 340,000 PVU/lb. and a ferrous salt, so that a synergistic deodorizing effect is achieved with said mixture thereby abating said odors.

4,034,079

SELF-SANITIZING PLASTIC

Marten Leonard Schoonman, 906 N. Elam Ave., Greensboro, N.C. 27408

Continuation of Ser. No. 441,775, Feb. 12, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,381
Int. Cl.² A61K 31/745
U.S. Cl. 424—83 8 Claims

1. A self-sanitizing plastic article consisting essentially of a moldable polyethylene resin and uniformly dispersed therethrough about 0.5 to 10 percent by weight of boric acid, about 0.5 to 10 percent by weight potassium or ammonium alum and about 0.5 to 3 percent by weight of a finely-divided inert particulate.

4,034,080

CHEMICAL ATTRACTANT FOR SMALLER EUROPEAN BARK BEETLE

Robert M. Silverstein; William E. Gore; Glenn T. Pearce, all of Syracuse, N.Y.; Roy A. Cuthbert, Delaware, Ohio; John B. Simeone; Gerald N. Lanier, both of Syracuse, N.Y., and John W. Peacock, Marion, Ohio, assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 14, 1976, Ser. No. 648,835
Int. Cl.² A01N 17/14
U.S. Cl. 424—84 4 Claims

2. An attractant composition for bark beetle *Scolytus multistriatus*, which comprises a mixture of the compounds 4-methyl-3-heptanol; 2,4-dimethyl-5-ethyl-6,8-dioxabicyclo (3.2.1) octane; and α-cubebene, wherein the proportions of the compounds are 1:1:2–10.

4,034,081

VACCINES AGAINST FELINE LEUKEMIA

William Fleming Hoggan Jarrett; James Oswald Jarrett, and Lindsay Joan Mackey, all of Glasgow, Scotland, assignors to University of Glasgow, Glasgow, Scotland

Division of Ser. No. 505,625, Sept. 13, 1974, Pat. No. 3,966,907. This application Mar. 18, 1976, Ser. No. 668,110
Claims priority, application United Kingdom, Sept. 18, 1973, 43642/73
Int. Cl.² A61K 38/12
U.S. Cl. 424—89 5 Claims

1. A vaccine for the prevention of disease caused by Feline leukemia virus which comprises in unit dosage form about 10^7–10^9 cells infected with live Feline leukemia virus, said cells having virus-associated antigens on their surface and wherein the cells and virus are inactivated by chemical or physical means without removing immunogenic properties from the cell surface.

4,034,082

METHOD TO PREVENT REPRODUCTION IN WARM-BLOODED FEMALE ANIMALS WITH NONAPEPTIDES

Edwin Samuel Johnson, Antioch, and Wilfrid Francis White, Arlington Heights, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Mar. 1, 1976, Ser. No. 662,759
Int. Cl.² A61K 37/02
U.S. Cl. 424—177 7 Claims

1. A process for preventing reproduction consisting essentially in administering to a female, warm-blooded animal in or before reaching the reproductive age, an effective dose of the nonapeptide L-pGlu-L-His-L-Trp-L-Ser-L-Tyr-X-L-Leu-L-Arg-L-Pro-NH-C_2H_5 wherein X denotes the divalent, optically active D-form of tryptophane, tyrosine or phenylanine for at least one day in the period before said female produced one or more mature ova or after ovulation occurred.

4,034,083

COMPOSITIONS FOR INHIBITING ABSORPTION OF CHOLESTEROL

Fred Hugh Mattson, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Nov. 3, 1975, Ser. No. 628,265
Int. Cl.² A61K 31/70, 31/22, 31/23
U.S. Cl. 424—180 23 Claims

1. A composition of matter, comprising: a non-absorbable, non-digestible polyol fatty acid polyester having at least 4 fatty acid ester groups, wherein the polyol is selected from the group consisting of sugars and sugar alcohols containing from 4 to 8 hydroxyl groups and wherein each fatty acid group has from about 8 to about 22 carbon atoms; and sufficient fat-soluble vitamin selected from the group consisting of vitamin A, vitamin D, vitamin E and vitamin K, or mixtures thereof, to

prevent abnormally low levels of any of said fat-soluble vitamins in animals ingesting said composition.

4,034,084

METHOD OF INHIBITING MICROBIAL ACTIVITY USING INSOLUBLE DIALDEHYDE POLYSACCHARIDES

Judith Ann Siragusa, Hopewell, N.J., assignor to Personal Products Company, Milltown, N.J.

Continuation-in-part of Ser. No. 513,678, Oct. 10, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,704

Int. Cl.² A01N 9/00; A61K 31/70; A61L 13/00

U.S. Cl. 424—180 16 Claims

1. A method for inhibiting bacterial growth in a locus susceptible to bacterial growth comprising applying to said locus a bactericidally effective amount of a water-insoluble dialdehyde polysaccharide selected from the group consisting of dialdehyde cellulose and dialdehyde starch wherein said water-insoluble dialdehyde polysaccharide has a degree of polymerization of at least about 50 repeating units per molecule.

4,034,085

O-[1-ALKOXYPHOSPHORYL-3-METHYL-PYRAZOL(-5)YL]-(THIONO)PHOSPHORIC ACID ESTERS AND ESTER AMIDES

Hellmut Hoffmann, Wuppertal, and Ingeborg Hammann, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

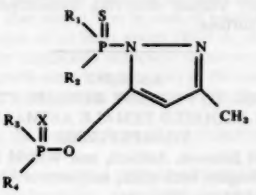
Filed Oct. 21, 1976, Ser. No. 734,480

Claims priority, application Germany, Oct. 28, 1975, 2548183

Int. Cl.² A01N 9/36; C07F 9/65

U.S. Cl. 424—200 10 Claims

1. A diphosphorylated pyrazole of the formula



in which

R_1 is alkoxy with 1 to 4 carbon atoms,

R_2 and R_3 each independently is alkoxy or alkylthio with 1 to 6 carbon atoms,

R_4 is alkoxy, alkylthio, alkylamino or alkyl with 1 to 5 carbon atoms, provided that at least one of the radicals R_2, R_3 and R_4 is alkylthio, and

X is oxygen or sulfur.

9. A method of combating arthropods, which comprises applying to the arthropods, or to habitat thereof, an arthropodicidally effective amount of a compound according to claim 1.

4,034,086

PYRROLIDONE-5,5-DIPHOSPHONIC ACIDS

Walter Plöger, Hilden Rhineland; Manfred Schmidt-Dunker, Dusseldorf, and Christian Gloxhuber, Haan Rhineland, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

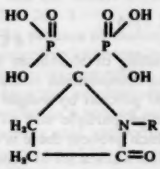
Division of Ser. No. 498,997, Aug. 20, 1974, Pat. No. 3,960,888. This application Feb. 20, 1976, Ser. No. 659,926

Claims priority, application Germany, Aug. 27, 1973, 2343147

Int. Cl.² A61K 31/675

U.S. Cl. 424—200 7 Claims

1. A method for alleviating conditions caused by the abnormal deposition or dissolution of difficulty soluble calcium salts in the body of warm-blooded animals having said condition, which consists in administering to said warm-blooded animals a safe but effective amount for said treatment of from 0.05 to 500 mg per kg. of body weight of at least one pharmacologically acceptable pyrrolidone-5,5-diphosphonic acid compound selected from the group consisting of (A) a compound of the formula:



wherein R represents hydrogen and alkyl having 1 to 6 carbon atoms, and (B) non-toxic, pharmaceutically acceptable salts thereof.

4,034,087

PHARMACEUTICAL COMPOSITION AND PROCESS OF TREATMENT

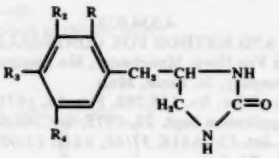
John J. Voorhees, Ann Arbor, Mich., assignor to The Regents of the University of Michigan, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 425,065, Dec. 17, 1973, abandoned, which is a continuation-in-part of Ser. No. 324,012, Jan. 16, 1973, abandoned. This application Jan. 5, 1976, Ser. No. 646,633

Int. Cl.² A61K 31/56, 31/415

U.S. Cl. 424—240 8 Claims

1. A process for treating a proliferative skin disease which comprises administering to the afflicted human or animal a composition containing as its active component at least one of the compounds selected from the group consisting of compounds characterized by the formula:



wherein R is halogen, hydrogen, lower alkyl and lower alkoxy; R_2, R_3 and R_4 taken independently of each other are hydrogen, lower alkoxy or hydroxy-lower alkoxy and provided that R_2, R_3 and R_4 taken independently of each other represent at least one oxygenated substituent; or R, R_2, R_3 and R_4 taken as a adjacent pair is methylenedioxy and the optical antipodes thereof, said compounds being in association with a pharmaceutical carrier and present in an amount in the range of about 0.1 to about 10% which is effective to alleviate a profiferative skin disease.

4,034,088

CEPHALOSPORIN DERIVATIVES, AND COMPOSITIONS CONTAINING THEM

Christian Berger, Le Plessis Robinson; Daniel Farge, Thiais; Georges Gros, Bourg-la-Reine; Mayer Naoum Messer, Bievres, and Claude Moutonnier, Le Plessis-Robinson, all of France, assignors to Rhone-Poulenc Industries, Paris, France

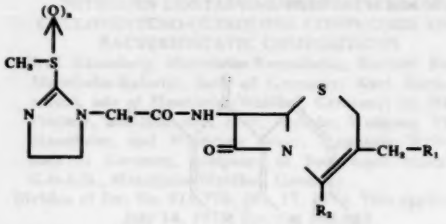
Filed Apr. 30, 1975, Ser. No. 573,110

Claims priority, application France, May 2, 1974, 74.15226; Mar. 26, 1975, 75.09517

Int. Cl.² C07D 501/20; A61K 31/545

U.S. Cl. 424—246 8 Claims

1. A cephalosporin compound of the formula:



(I)

in which R_2 is carboxy or pivaloyloxymethoxycarbonyl and either n is 1 or 2 and R_1 is acetoxy, (5-methyl-1,3,4-thiadiazol-2-yl)-thio or (2-methyl-1,2,3,4-tetrazol-5-Yl)-thio, or n is 0 and R_1 is (5-methyl-1,3,4-thiadiazol-2-yl)-thio or (1-methyl-1,2,3,4-tetrazol-5-yl)-thio, or a pharmaceutically acceptable non-toxic metal salt thereof or an addition salt thereof with a pharmaceutically acceptable non-toxic nitrogen-containing base.

8. A cephalosporin compound as claimed in claim 1 in which R_2 is carboxy or a pharmaceutically acceptable non-toxic metal salt thereof or an addition salt thereof with a pharmaceutically acceptable non-toxic nitrogen-containing base.

4,034,089

AQUEOUS SUSPENSIONS OF 7-[D-α-AMINO-α-(p-HYDROXYPHENYL)-ACETAMIDO]-3-(1,2,3-TRIAZOL-5-YLTHIOMETHYL)-3-CEPHEM-4-CARBOXYLIC ACID 1,2-PROPYLENE GLYCOLATE

Murray Arthur Kaplan, Syracuse, and Alphonse Peter Granatek, Baldwinsville, both of N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 534,114, Dec. 18, 1974, Pat. No. 3,970,651, which is a continuation-in-part of Ser. No. 431,251, Jan. 7, 1974, abandoned. This application Mar. 5, 1976, Ser. No. 664,218

Int. Cl.² A61K *31/545*

U.S. Cl. 424—246 **6 Claims**

1. A stable aqueous suspension useful for the treatment of bacterial infections in mammals comprising at least 30 mgm./ml. crystalline 7-[D-α-amino-α-(p-hydroxyphenyl-)acetamido]-3-(1,2,3-triazol-5-ylthiomethyl)-3-cephem-4-carboxylic acid 1,2-propylene glycolate and having a pH in the range of 2.8 – 5.

4,034,090

CEPHALOSPORIN DERIVATIVES

Christian Berger, Le Plessis Robinson; Daniel Farge, Thiais; Georges Gros, Bourg-la-Reine; Mayer Naoum Messer, Bievres, and Claude Moutonnier, Le Plessis-Robinson, all of France, assignors to Rhone-Poulenc Industries, Paris, France

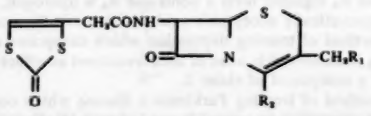
Filed June 30, 1975, Ser. No. 592,096

Claims priority, application France, July 1, 1974, 74.22867; May 22, 1975, 75.15937; May 22, 1975, 75.15938

Int. Cl.² C07D *501/20;* A61K *31/545*

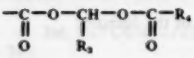
U.S. Cl. 424—246 **31 Claims**

1. A cephalosporin compound of the formula:



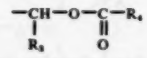
(I)

in which either (a) R_1 is hydrogen, acetoxy, azido, (1,2,3-thiadiazol-4-yl)-carbonylthio or heterocyclylthio selected from the class consisting of (1,3,4-thiadiazol-2-yl)-thio which is unsubstituted or substituted by straighrt or branched chain C_{1-4} alkyl or alkoxy, straight or branched chain C_{1-4} alkylthio, straight or branched chain C_{1-4} alkylsulphonyl, amino or acetylamino; (1,2,3,4-tetrazol-5-yl) thio which is unsubstituted or substituted in the 1-position by straight or branched chain C_{1-4} alkyl, hydroxy straight or branched chain C_{1-4} alkyl, phenyl or hydroxyphenyl, or in the 2-position by straight or branched chain C_{1-4} alkyl or hydroxy straight or branched chain C_{1-4} alkyl; (1,2,4-triazol-3-yl)-thio; (4-methyl-1,3-thiazol-2-yl)-thio; and (3-methyl-1,2,4-thiadiazol-5-yl)-thio; and R_2 is carboxy or a radical of the formula:



(II)

in which the radical:



(III)

is a radical which can be easily removed enzymatically, and in which R_3 is hydrogen or straight or branched chain C_{1-4} alkyl and R_4 is straight or branched chain C_{1-4} alkyl or cyclohexyl; or (b) R_1 is the pyridinio ion and R_2 is the carboxylato ion; or, when R_2 represents carboxy, a pharmaceutically acceptable non-toxic metal salt thereof or addition salt thereof with a pharmaceutically acceptable non-toxic nitrogen-containing base.

30. A pharmaceutical antibacterial composition which comprises, as active ingredient, a cephalosporin compound as claimed in claim 1 together with a significant amount of a pharmaceutically acceptable carrier, diluent or adjuvant.

4,034,091

N-(ARYLSULFONYL)-2-NITRO-2-(TETRAHYDRO-2H-1,3-THIAZIN-2-YLIDENE)ACETAMIDES

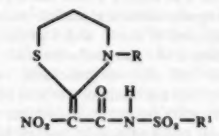
James E. Powell, Kent, England, assignor to Shell Oil Company, Houston, Tex.

Filed May 10, 1976, Ser. No. 684,830

Int. Cl.² C07D *279/06;* A61K *31/54*

U.S. Cl. 424—246 **5 Claims**

1. A compound of the formula:



wherein R is hydrogen or middle halogen and R^1 is phenyl or phenyl substituted by from one to two of one or more of halogen, nitro, cyano, alkyl or alkoxy of from one to six carbon atoms or phenoxy.

4. An insecticidal composition comprising an insecticidal amount of a compound according to claim **1**, together with a carrier, and optionally a surface-active agent.

4,034,092

7-ACYL-3-(CARBOXYALKYL AND CARBAMOYLALKYL SUBSTITUTED OXADIAZOLYLTHIOMETHYL) CEPHALOSPORINS

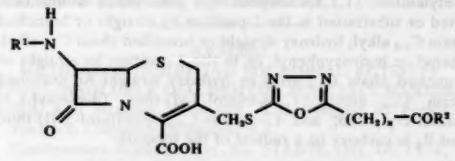
David A. Berges, Wayne, Pa., assignor to SmithKline Corporation, Philadelphia, Pa.

Filed May 3, 1976, Ser. No. 682,948

Int. Cl.² C07D *501/20;* A61K *31/545*

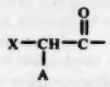
U.S. Cl. 424—246 **19 Claims**

1. A compound of the formula:



in which:

R^1 is an acyl group of the formula:



where:

X is thienyl; dihydropheny; phenyl or phenyl monosubstituted with hydroxy, hydroxymethyl, formamido, ureido, or carboxymethylamino;

A is NH_2, OH, COOH or SO_3H; or formyloxy when X is phenyl;

n_2 is 1 to 5; and

R^2 is hydroxy, amino, lower alkylamino or di(lower)-alkylamino,

or a non-toxic pharmaceutically acceptable salt thereof.

14. A anti-bacterial pharmaceutical composition comprising a compound as claimed in claim 1 and a pharmaceutically acceptable carrier therefor.

4,034,093

4(1H)-PYRIMIDINONES

Kurt Klemm, Allensbach, and Erhard Langenscheid, Konstanz, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Konstanz, Germany

Filed Sept. 4, 1973, Ser. No. 393,814

Claims priority, application Luxembourg, Sept. 8, 1972, 66036; Sept. 8, 1972, 66037; Sept. 8, 1972, 66038

Int. Cl.² C07D *239/22;* **A61K** *31/535*

U.S. Cl. 424—251 **23 Claims**

1. A compound which is characterized by physiological activity, pharmaceutical acceptability, xanthineoxidase-inhibitory utility and a structure which has a (1H)-pyrimidine nucleus that is (organic-acid-acyl)amino substituted in the 1-position, unsubstituted in the 2- and 6-positions, oxo substituted in the 4-position and cyano substituted in the 5-position; the organic acid of the organic-acid acyl being a diazinoheterocyclic-free carbonic or carboxylic acid, a carbon atom of which is directly bound to the amino nitrogen.

16. A medicament composition in dosage form which contains, as a pharmacologically-active component thereof, an effective amount of at least one compound according to claim 1 and pharmaceutical vehicle or diluent therefor.

4,034,094

8-ALKYL-5-OXO-5,8-DIHYDRO-PYRIDO(2,3-d)PYRIMIDINE-6-CARBOXYLIC ACIDS FOR TREATING URINARY TRACT INFECTIONS

Marcel Pesson, Paris, France, assignor to Laboratoire Roger Bellow, Neuilly-sur-Seine, France

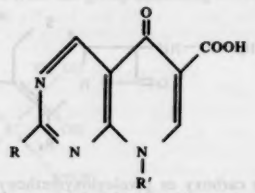
Division of Ser. No. 384,203, July 31, 1973, Pat. No. 3,950,338. This application Oct. 24, 1975, Ser. No. 625,767

Claims priority, application France, Aug. 2, 1972, 72.27876

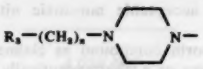
Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 **2 Claims**

1. A pharmaceutical composition for treating urinary tract infections induced by Gram negative micro-organisms comprising a non-toxic pharmaceutical carrier and, as an essential active ingredient, an antibacterially effective amount of an 8-alkyl-5-oxo-5,8 dihydropyrido (2,3-d)-pyrimidine-6-carboxylic acid of the formula:



in which R′ is lower alkyl and R is a piperazino radical of the formula:



wherein *n* is a number from 0 to 3 and R_3 is selected from hydrogen, hydroxy, vinyl, phenyl, phenyl-substituted by halogen and lower alkoxy groups of from 1 to 5 carbon atoms.

4,034,095

BENZO[5,6]CYCLOHEPTA[1,2-c]PYRIDINES

Jean-Michel Bastian, Therwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

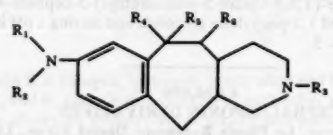
Filed Sept. 9, 1976, Ser. No. 721,835

Claims priority, application Switzerland, Sept. 15, 1975, 11930/75; Sept. 15, 1975, 11931/75; Sept. 15, 1975, 11932/75

Int. Cl.² C07D *221/16*

U.S. Cl. 424—256 **29 Claims**

1. A compound of formula



I

wherein

R_1 is hydrogen or alkyl of 1 to 4 carbon atoms,

R_2 is hydrogen or alkyl of 1 to 4 carbon atoms,

R_3 is hydrogen or alkyl of 1 to 4 carbon atoms, and

either

i. R_4, R_5 and R_6 each is hydrogen,

or

ii. R_4 and R_5 together are oxygen and R_6 is hydrogen,

or

iii. R_4 and R_5 together form a bond and R_5 is hydrogen,

or a pharmaceutically acceptable acid addition salt thereof.

27. A method of treating depression which comprises administering to an animal in need of such treatment an effective amount of a compound of claim 1.

28. A method of treating Parkinson's disease which comprises administering to an animal in need of such treatment an effective amount of a compound of claim 1.

29. A pharmaceutical composition for use in treating depression and parkinson's disease comprising a therapeutically effective amount of a compound of claim 1 in association with a pharmaceutical carrier of diluent.

4,034,096

NITROGEN CONTAINING DERIVATIVES OF CYCLOPENTENO-QUINOLONE COMPOUNDS AND BACTERIOSTATIC COMPOSITIONS

Alfred Rhomberg, Mannheim-Neuostheim; Herbert Berger, Mannheim-Kafertal, both of Germany; Kurt Stach, deceased, late of Mannheim-Waldhof, Germany; by Werner Plattner, administrator, Linz, Austria; Wolfgang Vömel, Mannheim, and Winfriede Sauer, Mannheim-Wallstadt, both of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

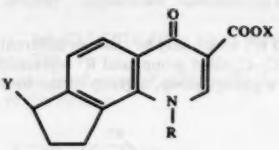
Division of Ser. No. 515,790, Oct. 17, 1974. This application July 14, 1975, Ser. No. 595,953

Claims priority, application Germany, Nov. 27, 1973, 2358909

Int. Cl.² C07D *215/56*

U.S. Cl. 424—258 17 Claims

1. Cyclopenteno-quinolone compound of the formula



(I)

wherein

R is saturated or unsaturated aliphatic hydrocarbyl of up to 5 carbon atoms,

X is hydrogen or alkyl of up to 5 carbon atoms,

Y is azido, nitrile, amino, mono- or dialkylamino, mono- or dialkanoylamino, mono- or dialkylaminomethyleneamino, pyrrolidino or piperidino, of up to 5 carbon atoms per alkyl moiety,

and the pharmacologically compatible salts thereof.

14. Pharmaceutical composition having bacteriostatic activity comprising a pharmaceutically acceptable carrier and, in effective amounts, at least one cyclopenteno-quinolone compound as claimed in claim 1.

4,034,097

SYNERGISTIC BIOSTATIC COMPOSITION

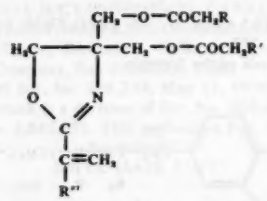
John S. Kuczkowski, Chicago, and William A. Konitz, Kankakee, both of Ill., assignors to Mortell Company, Kankakee, Ill.

Division of Ser. No. 401,402, Sept. 27, 1973, Pat. No. 3,947,576. This application Nov. 28, 1975, Ser. No. 636,154

Int. Cl.² A01N *9/00, 9/22*; C07D *211/00, 213/00*

U.S. Cl. 424—263 4 Claims

1. A biocidal complex for contact sterilization prepared by mixing with high shear at room temperture or above about 25–55% of a vinyl oxozaline fatty or carboxylic acid ester of tris-(hydroxymethyl)-amino-methane of the formula:



where R, R' and R'' are the same or different alkyl groups each of 1 to 17 carbon atoms, and about 29–69% of the biocide 2,3,5,6-Tetrachloro-4-(methylsulfonyl)-pyridine and about 6–16% of the biocide 3,7-Dichlorodibenz-(be)-(1,4)-oxiodinium bisulfate for a total of 100%.

3. A biocidal composition with a pH of about 4–9 comprising a biocidally effective amount of the composition of claim 1 and a compatible carrier material comprising water.

4,034,098

SULPHONAMIDOPIPERIDYL DERIVATIVES

John Leheup Archibald, Windsor, and John Lambert Jackson, Royston, both of England, assignors to John Wyeth & Brother Limited, Maidenhead, England

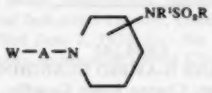
Filed Nov. 24, 1975, Ser. No. 634,567

Claims priority, application United Kingdom, Dec. 11, 1974, 53643/74

Int. Cl.² C07D *211/56*

U.S. Cl. 424—267 6 Claims

1. A compound having the general formula



(Ia)

wherein W represents a phenyl radical, which may be unsubstituted or substituted by halogen, lower alkyl, lower alkoxy or hydroxy; A represents a lower alkylene radical, an oxo lower alkylene radical or a hydroxy lower alkylene radical; R represents a phenyl radical optionally substituted by halogen, lower alkyl, lower alkoxy or hydroxy, a cycloalkyl radical of 5 to 7 carbon atoms or a lower alkyl radical; R^1 represents hydrogen or a lower alkyl radical; or a pharmaceutically acceptable acid addition or quaternary ammonium salt thereof.

6. A hypotensive composition comprising a therapeutically effective amount of a compound as claimed in claim 1 or a pharmaceutically acceptable acid addition or quaternary ammonium salt thereof together with a pharmaceutically acceptable carrier.

4,034,099

COMPOSITIONS AND METHOD FOR TREATING MASTITIS IN MILK ANIMALS

Jack T. Bryan, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 456,030, March 29, 1974, abandoned. This application Sept. 2, 1975, Ser. No. 609,462

Int. Cl.² A61K *31/43, 47/00*

U.S. Cl. 424—271 51 Claims

1. A method of treating mastitis in milk animals which comprises administering to the affected mammary region by intramammary infusion a composition which comprises an effective amount of an anti-mastitis medicament dispersed in a gelled vehicle for carrying said anti-mastitis medicament comprising a vegetable oil acceptable for intramammary infusion selected from the group consisting of non-drying, semi-drying, and drying oils and blends thereof; and from about 0.5% to 5.0% by weight of said oil of a fatty acid ester formed from a fatty acid selected from the group consisting of long chain saturated and unsaturated monocarboxylic acids having from twelve to twenty carbon atoms, inclusive, and a member selected from the group consisting of glycerin, propylene glycol, mono- and dihydric alcohols of from one to twelve carbon atoms, inclusive, and polyethylene glycols having a molecular weight of between about 200 and about 6000.

4,034,100

ANTIHYPERTENSIVE AGENTS

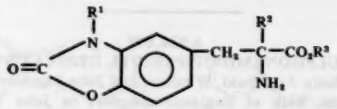
Patrick S. Callery, Cockeysville; Nicolas Zenker, Lutherville; Jeremy Wright, Baltimore, all of Md., and Clement A. Stone, Blue Bell, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 13, 1976, Ser. No. 657,826

Int. Cl.² C07D *263/58*

U.S. Cl. 424—272 9 Claims

1. A compound of the formula:



wherein each of R', R^2 and R^3 is hydrogen or alkyl of from 1 to 3 carbon atoms, and the pharmaceutically acceptable acid-addition salts thereof.

8. A method for the treatment of hypertension in a mammalian species which comprises administering to a hypertensive subject an effective amount of a compound of claim **1.**

4,034,101
N-OXY AND N-AMINO GUANIDINES

Graham John Durant; Charon Robin Ganellin, and Geoffrey Robert Owen, all of Welwyn Garden City, England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, England

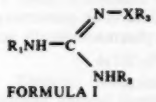
Filed June 11, 1975, Ser. No. 585,898

Claims priority, application United Kingdom, June 28, 1974, 28722/74

Int. Cl.² A61K *31/415;* **C07D** *233/64*

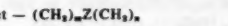
U.S. Cl. 424—273 **19 Claims**

1. A compound of the formula:



FORMULA I

wherein R_1 represents a grouping of the structure shown in the formula:

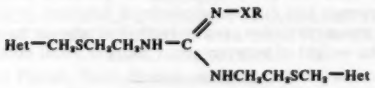


FORMULA II

wherein Het is imidazole which is attached at a ring carbon and which is optionally substituted by lower alkyl, chlorine or bromine; Z is sulphur or a methylene group; *m* is 0, 1 or 2 and *n* is 2 or 3 provided that the sum of *m* and *n* is 3 or 4; R_2 is hydrogen, lower alkyl or a grouping of the structure shown in Formula II wherein Het, *m*, *n* and Z are as defined above; X is oxygen and R_2 is hydrogen, lower alkyl, phenyl or benzyl, or a pharmaceutically acceptable acid addition salt thereof.

13. A method of blocking histamine H_2-receptors which comprises administering to an animal in need of blocking of histamine H_2-receptors in an effective amount to block histamine H_2-receptors a compound of claim **1.**

15. A compound of the formula:



wherein Het is imidazole which is attached at a ring carbon and which is optionally substituted by lower alkyl, chlorine or bromine; X is oxygen or NH; and R is hydrogen, lower alkyl, phenyl or benzyl, or a pharmaceutically acceptable acid addition salt thereof.

18. A method of blocking histamine H_2-receptors which comprises administering to an animal in need of blocking of histamine H_2-receptors in an effective amount to block histamine H_2-receptors a compound of claim **15.**

4,034,102
4-SUBSTITUTED-1,3-DITHIOLAN-2-YLIDENE MALONATES AND PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME

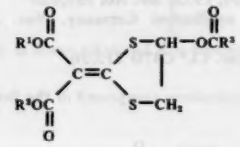
Kuniaki Taninaka, Ibaragi; Hitoshi Kurono, Amagasaki, and Tsutomu Kasai, Sakai, all of Japan, assignors to Nihon Nohyaku Co. Ltd., Tokyo, Japan

Filed June 6, 1975, Ser. No. 584,410

Int. Cl.² A61K *31/385;* **C07D** *339/06*

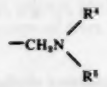
U.S. Cl. 424—277 **28 Claims**

1. A compound represented by the general formula

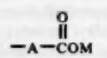


(I)

wherein R^1 and R^2, which may be same or different, represent individually a C_1–C_4 alkyl group; and R^3 represents a chloromethyl group, a phenyl group, a group of the formula



(where R^4 and R^5 represent individually a C_1–C_4 alkyl group, or a group of the formula



(where M represents a hydrogen atom or a pharmaceutically acceptable salt-forming residue; and A represents a lower alkylene group, a lower alkenylene group, a phenylene group or a cyclohexenylene group).

6. A pharmaceutical composition for preventing liver necrosis, fatty liver or hepatitis of animals including humans, which comprises an effective amount sufficient for said purpose of a compound having the general formula (I) defined in claim **1,** and a pharmaceutically acceptable diluent.

4,034,103
ARALKYLAMINO SULFONES HAVING SPASMOLYTIC ACTIVITIES

Jan Hartog, and Johannes Maria Antonius Zwagemakers, both of Weesp, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

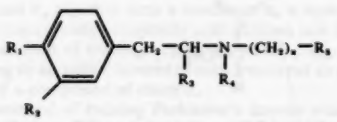
Filed Apr. 3, 1975, Ser. No. 564,789

Claims priority, application Netherlands, Apr. 8, 1974, 7404732

Int. Cl.² A61K *31/135;* **C07C** *87/28, 91/30*

U.S. Cl. 424—282 **5 Claims**

1. Compounds of the formula



wherein R_1 represents an alkyl group, an alkoxy group, an alkylthio group or a dialkylamino group, which groups have up to 2 carbon atoms, a hydroxy group, a hydrogen atom, a chlorine atom or a fluorine atom, R_3 represents a hydrogen atom or, if R_1 represents a hydrogen atom, one of the remain-

ing groups recited for R_1, while R_1 and R_2 both may represent an alkoxy group having 1 or 2 carbon atoms or together a methylene dioxy group or ethylene dioxy group; R_3 is an alkyl group having 1 or 2 carbon atoms; R_4 is an alkyl group having 1 to 3 carbon atoms; n is an integer number from 3 to 20 and R_5 is a group SO_2R_6, wherein R_6 denotes an alkyl group having 1 to 3 carbon atoms and salts thereof formed with pharmaceutically acceptable acids.

4. A pharmaceutical composition comprising a compound of claim 1 in a spasmolytically effective amount and an inert pharmaceutically acceptable carrier therefor.

4,034,104
CARBAMIC ACID ESTERS OF GALLIC ACID, THEIR ESTERS, AND HEAVY METAL SALTS

Werner Daum, Krefeld; Wilhelm Brandes, Cologne, and Paul-Ernst Frohberger, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

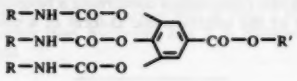
Filed June 10, 1976, Ser. No. 694,861

Claims priority, application Germany, July 3, 1975, 2529648

Int. Cl.² C07F 3/06; A01N 9/20

U.S. Cl. 424—289 **8 Claims**

1. A carbamic acid ester of gallic acid, its ester or heavy metal salt, of the formula

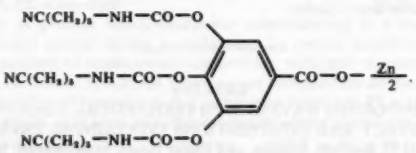


in which

R is alkyl with up to 8 carbon atoms optionally substituted by halogen or cyano, and

R′ is hydrogen, optionally halogen-substituted alkyl with up to 6 carbon atoms or one equivalent of a heavy metal atom.

4. The compound according to claim 1 wherein such compound is tris-(N-ω-cyanopentyl)-carbamoyl)-gallate of the formula



5. A fungicidal composition containing as active ingredient a fungicidally effective amount of a compound according to claim 1 in admixture with a solid or liquefied gaseous diluent or carrier or in admixture with a liquid diluent or carrier containing a surface-active agent.

4,034,105
NEMATOCIDAL N-CYANOFORMYL CARBAMATES AND N-CYANOFORMYL THIOLCARBAMATES

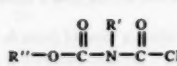
Malcolm S. Singer, Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 470,234, May 15, 1974, Pat. No. 3,956,364, which is a division of Ser. No. 280,608, Aug. 14, 1972, Pat. No. 3,845,091. This application Feb. 23, 1976, Ser. No. 660,597

Int. Cl.² A61K 31/27

U.S. Cl. 424—300 **18 Claims**

1. A method for control of nematodes which comprises contacting the nematodes with a nematocidally effective amount of a compound of the formula



or

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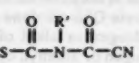


wherein R′ is alkyl of 1 to 6 carbon atoms, R″ is alkyl of 1 to 10 carbon atoms, alkenyl of 2 to 10 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, biphenyl, phenyl, hydrocarbon aralkyl of 7 to 10 carbon atoms, or phenyl substituted with from 1 to 3 groups selected from fluorine, chlorine, bromine and alkyl of 1 to 6 carbon atoms, and R‴ is R″.

4,034,106
ALKANOLAMINE DERIVATIVES

Leslie Harold Smith, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

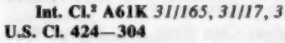
Filed June 2, 1975, Ser. No. 582,883

Claims priority, application United Kingdom, June 5, 1974, 24837/74

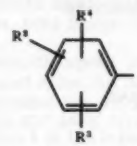
Int. Cl.² A61K 31/165, 31/17, 31/275; C07C 121/80

U.S. Cl. 424—304 **10 Claims**

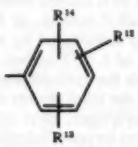
1. An alkanolamine derivative selected from a compound of the formula:



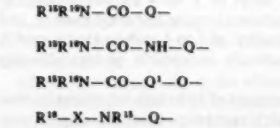
wherein A is alkylene of from 2 to 12 carbon atoms; wherein X is carbonyl (—CO—); wherein Y is a direct link, or is alkylene or alkyleneoxy each of up to 6 carbon atoms, and wherein R is aryl of the formula:



and R^1 is aryl of the formula:



wherein R^2, R^3, R^{12} and R^{13}, which may be the same or different, each is hydrogen, halogen, hydroxy, amino, nitro or cyano, or alkyl, hydroxyalkyl, cycloalkyl, alkenyl, alkynyl, alkoxy, alkylthio, cycloalkoxy, alkenyloxy, alkynyloxy or alkanoyl each of up to 6 carbon atoms or aryl, aryloxy or dialkylamino each of up to 12 carbon atoms; or wherein R^2 and R^3 together, and/or R^{12} and R^{13} together, form trimethylene, tetramethylene, 1-oxotetramethylene, propenylene, but-2-enylene or buta-1,3-dienylene such that together with two adjacent carbon atoms of the benzene ring they form respectively indanyl, 5,6,7,8-tetrahydronaphthyl, 5-oxo-5,6,7,8-tetrahydronaphthyl, indenyl, 5,8-dihydronaphthyl or naphthyl; wherein R^4 is hydrogen or amidic of the formula:



or

wherein Q is a direct link or is alkylene or alkenylene each of up to 6 carbon atoms; wherein Q^1 is alkylene of up to 6 carbon atoms; wherein R^{15} is hydrogen or alkyl of up to 6 carbon atoms; wherein R^{16} is hydrogen or alkenyl, cycloalkyl, hydroxyalkyl or alkoxyalkyl each of up to 6 carbon atoms, or alkyl, aryl, aralkyl, or aralkenyl each of up to 10 carbon atoms; wherein X is carbonyl; and wherein R^{14} is amidic as defined above for R^4; and an acid-addition salt thereof.

9. A method for the treatment of prophylaxis of heart diseases and hypertension in a warm-blooded animal which comprises administering to said animal an effective amount of at least one compound claimed in claim **1**.

10. A method for producing coronary β-adrenergic blockade in a warm-blooded animal in need of such blockade which comprises administering to said animal an effective amount of at least one compound claimed in claim **1**.

4,034,107
SUBSTITUTED (ALKOXYCARBONYLTHIOUREIDO)-(ACYLAMINO)-BENZENE DERIVATIVES

Leslie George King, London; Glyn Evan Lee, Thorpe Bay; George Christopher James Martin, Brentwood, and David Conwil Jenkins, Barkingside, all of England, assignors to May and Baker Limited, Dagenham, England

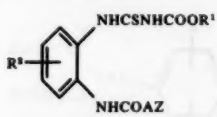
Filed Nov. 4, 1975, Ser. No. 628,669

Claims priority, application United Kingdom, Nov. 5, 1974, 47889/74

Int. Cl.² A61K *31/24*; **C07C** *149/40*; **A01N** *9/20*

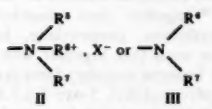
U.S. Cl. 424—309 **53 Claims**

1. A benzene derivative of the formula:



I

wherein R^1 represents alkyl of 1 to 4 carbon atoms, R^2 represents a group selected from $-SR^3$, $-SOR^3$, $-SO_2R^3$, $-OR^3$, $-SCONH_2$, and $-T(CH_2)_mT^1R^4$, wherein R^3 represents alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 7 carbon atoms, alkenyl or alkynyl of 3 to 6 carbon atoms, aralkyl with 1 or 2 carbon atoms in the alkyl moiety, or R^3 represents an aryl group or an aryl group substituted by a halogen atom or an alkyl or alkoxy group of 1 to 3 carbon atoms, or represents cycloalkylalkyl in which the cycloalkyl moiety contains from 3 to 7 carbon atoms and the alkyl moiety contains 1 or 2 carbon atoms, R^4 represents hydrogen, alkyl of 1 to 4 carbon atoms, T and T^1 each represent oxygen, sulphur or sulphinyl, and m is an integer from 1 to 7 inclusive whose position on the benzene ring is either para to the group $-NHCSNHCOOR^1$ or para to the group $-NHCOAZ$, A represents a bivalent straight-chain aliphatic hydrocarbon radical of 1 to 4 carbon atoms or a said hydrocarbon radical substituted by at least one methyl group, and Z represents a group of the formula:



II III

wherein R^5 represents hydrogen, alkyl of 1 to 4 carbon atoms, R^6 represents hydrogen, alkyl of 1 to 4 carbon atoms, or phenylalkyl with 1 to 2 carbon atoms in the alkyl moiety, and R^7 represents hydrogen or alkyl of 1 to 4 carbon atoms, and X^- represents a pharmaceutically acceptable or agriculturally acceptable anion.

10. Method for the treatment of helminth infections in man and domestic animals which comprises administering to man or a domestic animal infected with helminths an anthelmintically effective amount of at least one benzene derivative as claimed in claim **1** or a pharmaceutically acceptable salt thereof.

19. Fungicidal compositions which comprise, as the active ingredient, at least one benzene compound as claimed in claim **1**, any anion X^- present in the benzene compound being an agriculturally acceptable anion, in association with one or more diluents compatible with the benzene compound and suitable for use in agricultural fungicidal compositions, the amount of benzene compound present in the composition being between 0.005% and 95% by weight of the composition.

4,034,108
N-(1'-ALKOXYCARBONYL-ETHYL)-N-HALOACETYL-2,6-DIALKYLANILINES FOR THE CONTROL OF PHYTOPATHOGENIC FUNGI

Hans Moser, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

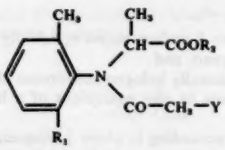
Continuation-in-part of Ser. No. 405,618, Oct. 11, 1973, abandoned. This application June 16, 1975, Ser. No. 587,589

Claims priority, application Switzerland, Aug. 29, 1973, 1237/73; Oct. 13, 1972, 15044/72

Int. Cl.² A01N *9/20*, *9/24*

U.S. Cl. 424—309 **9 Claims**

1. A fungicidal composition comprising a fungicidally effective amount of the enantiomeric D-form of a compound of formula I



(I)

wherein R_1 and R_2 each independently are methyl or ethyl, and Y is fluorine, chlorine, bromine or iodine, together with a suitable inert carrier

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4,034,109
COMPOUNDS HAVING A PHYSIOLOGICAL COOLING EFFECT AND COMPOSITIONS CONTAINING THEM

David G. Rowsell, Staines, and Roger Hems, Maidenhead, both of England, assignors to Wilkinson Sword Limited, England

Filed July 20, 1973, Ser. No. 381,098

Claims priority, application United Kingdom, Jan. 18, 1973, 2686/73

Int. Cl.² A61K *31/22*, *31/18*

U.S. Cl. 424—311 **1 Claim**

1. A method of stimulating the cold receptors of the nervous system of the surface tissues of the human body, which comprises bringing into contact with said tissues an effective amount of a cold receptor stimulating acyclic sulphonamide or sulphinamide of the formula:

$$RSO_xNR_1R_2$$

where

R is a secondary or tertiary alkyl group containing from 5–12 carbon atoms;

R_1 and R_2, when taken separately, are each hydrogen, C_1–C_{12} alkyl or C_1–C_{12} hydroxyalkyl, and together provide a total of no more than 12 carbon atoms, with the proviso that when R_1 is hydrogen R_2 may also be alkylcarboxyalkyl of up to 12 carbon atoms; and x is an integer of from 1–2 inclusive,

R, R_1 and R_2 together providing a total of from 6–18 carbon atoms.

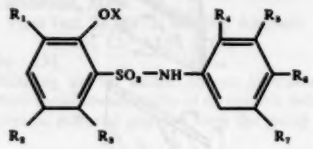
4,034,110

ANTHELMINTICS EFFECTIVE AGAINST LIVER FLUKES

Milan Mitrovic, Nutley, and Terence James Hayes, Upper Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Sept. 20, 1976, Ser. No. 724,785
Int. Cl.[2] A61K *31/18, 31/22*
U.S. Cl. 424—311 10 Claims

1. A method for the treatment of *Fasciola hepatica* infections which comprises administering to an animal infected with *Fasciola hepatica* an anthelmintically effective amount of a composition comprising a non-toxic carrier material and an anthelmintic compound represented by the formula



wherein each of

R_1 and R_2 are independently chlorine or bromine,

R_3 is hydrogen or chlorine and each of

R_4 through R_7 is independently hydrogen, halogen or trifluoromethyl, with the proviso that at least 2 of R_5 through R_7 is other than hydrogen and X is hydrogen or lower alkanoyl.

4,034,111

COMPOSITIONS OF AND NEW USES FOR N-ACYLANILINOBUTYRIC ACIDS

Wolfgang Schoetensack, Hegne, and Richard Riedel, Constance, both of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Constance, Germany

Filed Apr. 25, 1975, Ser. No. 571,501
Claims priority, application Germany, Oct. 25, 1974, 2450680; Luxembourg, Apr. 30, 1974, 69970
Int. Cl.[2] A61K *31/195*
U.S. Cl. 424—319 16 Claims

1. A process which comprises administering to a warm-blooded animal having a cardiovascular system insufficiency an amount of medicament composition sufficient to counteract the insufficiency; the medicament composition containing a plurality of ingredients and comprising from 1 to 95 percent by weight of at least one physiologically-active and pharmacologically-acceptable ingredient which is an N-acylanilinobutyric acid or an essentially non-toxic salt thereof.

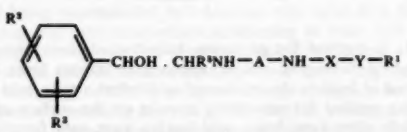
4,034,112

ETHANOLAMINE DERIVATIVES HAVING β-ADRENERGIC BLOCKING ACTIVITY

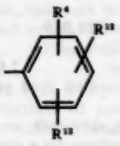
Leslie Harold Smith, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 479,174, June 13, 1974, Pat. No. 3,944,611. This application Dec. 29, 1975, Ser. No. 645,300
Claims priority, application United Kingdom, June 22, 1973, 29679/73
Int. Cl.[2] A61K *31/18*
U.S. Cl. 424—321 11 Claims

1. An ethanolamine derivative selected from the group consisting of a compound of the formula:



wherein A is alkylene of from 2 to 6 carbon atoms, wherein R^1 is hydrogen or alkyl, alkenyl, halogenoalkyl or cycloalkyl each of up to 6 carbon atoms, or aryl of the formula:



wherein R^2, R^3, R^{12} and R^{13}, which may be the same or different, each is hydrogen, halogen, nitro, amino or cyano, or alkyl alkenyl, alkoxy, alkenyloxy, hydroxyalkyl, alkanoyl, acylamino or alkanesulphonamido each of up to 6 carbon atoms, wherein R^4 is hydrogen, hydroxy or carbamoyl, wherein R^5 is hydrogen or alkyl of up to 6 carbon atoms, wherein X is sulphonyl and wherein Y is a direct link, or alkylene or alkylenoxy each of up to 6 carbon atoms, or imino (—NH—) or (except when R^1 is hydrogen) oxygen; and an acid-addition salt thereof.

9. A pharmaceutical composition having β-adrenergic blocking activity, comprising as active ingredient an effective amount of at least one alkanolamine derivative or an acid-addition salt thereof, claimed in claim 1, in association with a pharmaceutically-acceptable carrier therefor.

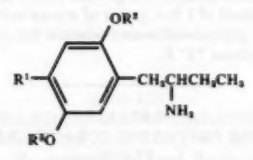
4,034,113

TREATMENT OF SENILE GERIATRIC PATIENTS TO RESTORE PERFORMANCE

Alexander T. Shulgin, 1483 Shulgin Road, Lafayette, Calif. 94549

Division of Ser. No. 566,458, April 9, 1975, abandoned, which is a continuation-in-part of Ser. No. 304,069, Nov. 6, 1972, abandoned. This application Apr. 15, 1976, Ser. No. 677,348
Int. Cl.[2] A61K *31/135*
U.S. Cl. 424—330 11 Claims

1. A method of treating senile geriatric humans to restore performance which comprises administering to said human an effective amount of a compound of the formula



wherein R^1, R^2 and R^3 are alike or different and each is (lower-)alkyl; or a pharmaceutically acceptable nontoxic salt thereof.

4,034,114

TREATMENT OF SKIN KERATOSES WITH RETINAL

Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128, and Eugene J. Van Scott, 1138 Sewell Lane, Rydal, Pa. 19046

Filed Sept. 15, 1976, Ser. No. 723,327
Int. Cl.[2] A61K *31/11*
U.S. Cl. 424—333 8 Claims

1. A method of treating actinic or nonactinic keratoses in humans having skin affected thereby without irritating the skin comprising:

administering topically to the affected skin a therapeutically effective amount of a composition comprising retinal in a pharmacologically acceptable vehicle, on a daily basis to eradicate actinic or nonactinic keratotic lesions.

4,034,115

MULTI-CURDLED MILK PRODUCT AND THE PROCESS FOR THE PREPARATION THEREOF

James Gordon Roberts, 161 Flamingo Drive, Clearwater, Fla. 33516

Filed July 29, 1975, Ser. No. 599,959
Int. Cl.² A23C 9/12
U.S. Cl. 426—43 7 Claims

1. A method of producing a multi-curdled food product which comprises:

a. effecting a first fermentaion of milk, skim milk, or cream with a lactic type, acid-producing culture for a period of time sufficient to produce buttermilk;

b. effecting a second fermentation of the product resulting from step (a) with a yogurt culture wherein said culture is selected from the group consisting of *Lactobacillus bulgaricus*, *Lactobacillus helveticus*, *Lactobacillus lactic*, and *Streptococcus thermophilus* between a temperature range of 105°–114° F. until the curds start to separate;

c. adding small amounts of colostrum to the product resulting from step (b); and then

d. effecting a third fermentation of the product resulting from step (c) with a lactobacillus culture wherein said culture is selected from the group consisting of *L. acidophilus* and *L. bifidus* at a temperature of approximately 98° F. for a period of time sufficient to produce a symbiotic product high in lactase content.

4,034,116

PACKAGED ROASTED COFFEE PRODUCTS

Matthew Hamell, Orangeburg, N.Y.; Arthur Stefanucci, Clifton, N.J., and William W. Ward, White Plains, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Continuation of Ser. No. 545,264, Jan. 30, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,577
Int. Cl.² B65D 85/70, 25/14
U.S. Cl. 426—131 4 Claims

1. A hermetically-sealed, vacuum-packed, roasted and ground coffee product comprising a rigid container containing an aroma solvent coating consisting essentially of a relatively odorless and tasteless aroma solvent over at least a portion of its interior surface, said solvent being selected from the group consisting of glycerides, waxes, paraffins, polyesters, polyethers, polysilicones and combinations thereof, wherein said container contains roasted and ground coffee and said coating is present at a level of 1 to 4 grams of aroma solvent per pound of roasted and ground coffee and wherein the coating exists as a solid below about 75° F.

4,034,117

PROCESS FOR PREPARING FORAGE CROP ANIMAL FEEDS

Elmer F. Glabe, Northbrook, Ill., assignor to Food Technology Products, Chicago, Ill.

Filed Nov. 6, 1975, Ser. No. 629,499
Int. Cl.² A23K 3/03
U.S. Cl. 426—335 5 Claims

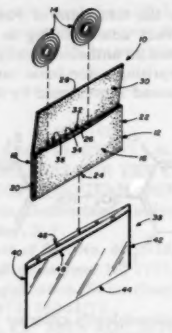
1. A process of treating hay and alfalfa forage crops which consists essentially in cutting and partially drying said crops in the field to a moisture content above 10% but not more than 65% by weight, intimately mixing the resultant forage crops with a quantity of sodium diacetate, and then consolidating the resultant product and storing it at ambient temperatures, the said temperature and moisture conditions being such that said crops when stored at ambient external temperatures in a baled or otherwise consolidated condition will reach an internal temperature of at least 120° F. at which they would normally have to be removed from storage to avoid spontaneous combustion, the quantity of sodium diacetate being sufficient to have a temperature depressing effect when the consolidated product is stored at ambient temperatures so that said internal temperature remains below 120° F.

4,034,118

METHOD OF SWEETENING OR MELLOWING ONIONS

Fred A. Martin, 3840 Arborlawn Drive, Fort Worth, Tex. 76109

Filed Jan. 5, 1976, Ser. No. 646,564
Int. Cl.² A23L 1/212
U.S. Cl. 426—431 6 Claims



1. A method of mellowing onions comprising:

peeling and slicing at least one onion to provide at least one onion slice having two major cut surfaces;

placing the resulting onion slice in a pouch comprising a liquid retaining material;

said pouch comprising opposed panel joined together along the bottom and opposite edges; the onion slice being positioned with at least one major surface of said onion slice engaging an adjacent surface of one of the panels of said pouch;

substantially moistening the pouch and the onion slice contained therein with a liquid selected from the group consisting of water, vinegar, and mixtures thereof; and

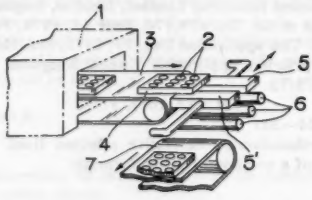
thereafter refrigerating the mositened pouch in contact with the onion slice contained therein at a temperature of about 40° F and for a period of time of between about 24 hours and about 72 hours.

4,034,119

METHOD AND APPARATUS FOR PREVENTING CAVE-IN OF BAKED GOODS

Takao Kanbe, Chofu; Yoshio Kaneko, Urawa, and Satoshi Nomura, Tokyo, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

Filed Jan. 27, 1976, Ser. No. 652,887
Int. Cl.² A21D 15/00; A21C 15/00
U.S. Cl. 426—497 10 Claims



1. A method for preparing baked goods comprising the steps of: baking an article; applying an impact force transferred at least to the interior of said baked article, said force being applied for preventing cave-in on the surface of said article after completing said baking step; said force being applied when the interior temperature of the baked article is substantially up to 5° C lower than the interior temperature

prevailing when baking of said article has been completed; said force applied to said article having a value equivalent to at least the impact force which would be applied to said article if it were to fall under gravity onto a rigid surface from a height of at least 3 centimeters, said impact force being applied by shock or vibration.

4,034,120

PELLETING AID FOR AGRICULTURAL PRODUCTS

Joseph Sidney Wortham, Brownsville, and Ernest Carlisle Johnson, Memphis, both of Tenn., assignors to W. R. Grace & Co., Cambridge, Mass.

Filed Oct. 28, 1975, Ser. No. 626,569
Int. Cl.² A23K *1/175*
U.S. Cl. 426—531 **8 Claims**

1. A pelletizing aid for edible fibrous agricultural refuse material which consists essentially of an organic fatty material with an inorganic material selected from the group consisting of:

a. mixtures of (1) an organic fatty material selected from the group consisting of animal fat, vegetable oils, hydrogenated vegetable oils and mixtures thereof and an inorganic material selected from the group consisting of finely divided unexpanded vermiculite ore and mixtures of finely divided vermiculite ore with expanded vermiculite; and

b. mixtures of an animal fat with an inorganic material selected from the group consisting of expanded vermiculite, finely divided unexpanded vermiculite ore and mixtures thereof.

4,034,121

FOODS WITH MICROCRYSTALLINE CHITIN

Howard J. Dunn, Lomita, and M. Paul Farr, San Pedro, both of Calif., assignors to Ralston Purina Company, St. Louis, Mo.

Continuation of Ser. No. 178,457, Sept. 7, 1971, Pat. No. 3,847,897. This application Nov. 13, 1972, Ser. No. 306,341
Int. Cl.² A23L *1/325*
U.S. Cl. 426—565 **7 Claims**

1. A food composition having improved thickening properties, said product comprising food material and a uniform, stable aqueous dispersion of microcrystalline chitin, characterized by a multiplicity of randomly spaced ruptured glycosidic bonds, particle sizes substantially invisible at a microscopic magnification of 1600X and having a microcrystalline chitin particle concentration of from 0.5% to 25% by weight of the dispsersion whereby the food product has an improved viscosity and an improved resistance against syneresis.

4,034,122

NON-FAT DRIED WHIPPING COMPOSITION

Bernard A. Patterson, 4040 N. LeClaire Ave., Chicago, Ill. 60641

Filed June 1, 1976, Ser. No. 691,834
Int. Cl.² A23L *1/00*
U.S. Cl. 426—570 **4 Claims**

1. A substantially fat-free dried whipping composition capable of being reconstituted by whipping with water to a high yield topping, said composition comprising at least 75% by weight of a mixture of at least one maltodextrin and corn syrup solids, said mixture having a DE value in the range from 10 to 42, from 5 to 10% by weight of a polyoxyethylene sorbitan stearate containing from 15 to 25 ethylene oxide groups, from 0.2 to 1% of a food stabilizer, and the balance being essentially a glyceride ester in which at least 90% of the ester groups present are long chain monoester groups.

4,034,123

COMPRESSED, FREEZE-DRIED COTTAGE CHEESE AND METHOD OF MAKING

Myer Glickstein, and Justin M. Tuomy, both of Framingham, Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 13, 1976, Ser. No. 657,985
Int. Cl.² A23C *19/00*
U.S. Cl. 426—582 **4 Claims**

1. Method of making compacted, freeze-dried cottage cheese which is readily rehydratable to form an acceptable reconstituted cottage cheese food product having good curd identity which comprises the steps of:

a. freeze-drying dry curd cottage cheese having a large curd size and a milk fat content of less than 0.5 percent prior to freeze-drying,

b. freeze-drying creamed cottage cheese having a large curd size and a milk fat content of about 4 to 4.5 percent prior to freeze-drying,

c. blending substantially equal quantities by weight of said freeze-dried, dry curd cottage cheese and said freeze-dried, creamed cottage cheese, and

d. compressing said blend of freeze-dried, dry curd cottage cheese and freeze-dried, creamed cottage cheese at a pressure of from about 500 psi to about 1000 psi, using a dwell time of at least about 10 seconds, whereby a compacted, freeze-dried cottage cheese having good curd identity upon rehydration thereof is obtained.

4,034,124

EMULSIONS

Antonius Franciscus van Dam, Vlaardingen, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed Nov. 19, 1975, Ser. No. 633,336
Claims priority, application United Kingdom, Nov. 25, 1974, 50958/74
Int. Cl.² A23D *3/00, 5/00*
U.S. Cl. 426—602 **17 Claims**

1. A water and oil emulsion, which contains at least 0.05%, based on the quantity of oil, of a phospholipo-protein which has been modified by phospholipase A to a degree of conversion of at least 10%.

4,034,125

SOURDOUGH COMPOSITIONS

William H. Ziemke, San Jose, Calif., and Elmer F. Glabe, Northbrook, Ill., assignors to Food Technology Products, Chicago, Ill.

Filed Dec. 31, 1975, Ser. No. 645,537
Int. Cl.² A21D *2/08, 2/18*
U.S. Cl. 426—650 **8 Claims**

1. A baking ingredient for use in making sourdough bakery products, said baking ingredient being in the form of a flowable powder for the introduction of acetic acid and lactic acid into bread doughs and other bakery products comprising minor quantities of acetic acid and lactic acid absorbed on a major quantity of a finely divided solid edible absorbent which is a starch polysaccharide or an edible cellulosic material, such baking ingredient being stabilized against premature loss of acetic acid and lactic acid, by intimate dispersion with a minor quantity of a normally solid edible fatty glyceride material sufficient to hold said acids in the absorbent and reduce evaporation of said acids during oven baking of said sourdough bakery products, the quantity of acetic acid being within the range of 2% to 15% by weight and the quantity of lactic acid being within the range of 1% to 8% by weight, and the weight ratio of acetic acid to lactic acid being at least 1:1.

4,034,126

PROCESS FOR COATING GRANULAR MATERIALS

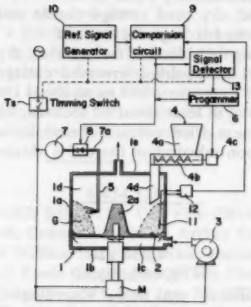
Yoshiro Funakoshi, Kyoto; Yoshihiko Matsumura, Kawanishi; Masaki Yamamoto, Suita, and Hiromu Komeda, Nara, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 419,964, Nov. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 213,608, Dec. 29, 1971, abandoned. This application Oct. 10, 1975, Ser. No. 621,621

Claims priority, application Japan, Dec. 29, 1970, 45-128947

Int. Cl.² B05D *1/00*

U.S. Cl. 427—8 9 Claims



1. A process for coating granular material having granules with a particle size within the range of 100 to 1,000 microns in a coating apparatus of the type having a rotatable dish, which dish is mounted in a stationary vessel, said stationary vessel having a rising inner surface contiguous to the periphery of said dish and curved upwardly therefrom to define a steadily rising surface from said dish, which comprises charging said granular material into said vessel and onto said rotatable dish while said rotatable dish is rotated at a predetermined speed, intermittently supplying a binding solution to said vessel by measuring the specific electro-resistance of a mass of said granular material by means of a detector including at least one electrode which is spaced from a portion of the rising inner surface of the vessel, feeding a signal indicative of the detected specific electro-resistance to a comparision circuit, comparing said signal from said detector with a reference value fed from a reference signal generator, said comparision circuit generating a control pulse only when said detected specific electro-resistance exceeds the reference value and continuing the generation of such control pulse during a period in which said detected specific electro-resistance is in excess of said reference value, said binding solution spraying being effected under a predetermined pressure onto the fluidized mass of said granular material by means of an electromagnetic valve opened by said control pulse during the duration of said control pulse, the electromagnetic valve being closed to discontinue spraying when the detected specific electro-resistance is less than the reference value and no control pulse is generated from said comparision circuit, and feeding coating powder continuously throughout the coating operation onto the fluidized mass of said granular material within said vessel.

4,034,127

METHOD OF FORMING AND TREATING CADMIUM SELENIDE PHOTOCONDUCTIVE BODIES

Charles John Busanovich, Princeton, N.J., and Robert Milton Moore, Carmel, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,682

Int. Cl.² H01L *21/363*

U.S. Cl. 427—76 10 Claims

1. A method for fabricating a photoconductive body on a surface of a substrate including the steps of:

a. vapor depositing within an evacuated chamber an overlayer of cadmium selenide on the surface of the substrate while maintaining the substrate at a temperature of from about 200° C. to about 500° C.; then

b. thermally treating the substrate including the cadmium selenide overlayer at a temperature of from about 450° C. to about 550° C. within a continuously renewed atmosphere substantially of an inert gas selected from the group consisting of argon, helium, and nitrogen, or mixtures thereof, for a period of time of at least 2 hours; and, thereafter

c. thermally treating the substrate including the cadmium selenide overlayer in air at a temperature of from about 250° C. to about 450° C. for a period of time from about 15 minutes to about 2 hours.

8. The method of claim 1, wherein the thermal treatment of step *c* is a temperature of about 400° C.

9. The method of claim 8, wherein the thermal treatment of step *c* is for a period of time of approximately 30 minutes.

4,034,128

PRODUCTION OF A COLOR DEVELOPING RECORD SHEET CONTAINING METAL-MODIFIED NOVOLAK RESIN PARTICLES

Russell D. Kelley, Waverly, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed May 5, 1975, Ser. No. 575,055

Int. Cl.² B41M *5/12*, *5/16*

U.S. Cl. 427—150 15 Claims

1. In a method of producing a color developing record sheet for pressure sensitive papers comprising the steps of grinding together an aqueous mixture of a metal-modified novolak resin and an anionic polymeric dispersing agent for said novolak resin to form an aqueous dispersion of finely divided metal-modified novolak resin particles, said aqueous dispersion containing up to about 58% of said metal-modified resin particles; preparing a coating composition by mixing together said aqueous mixture of said finely divided metal-modified novolak resin particles and a binder for said resin particles; applying said coating composition to a paper base: and drying said coated paper; the improvement comprising adding to said aqueous mixture at least 0.2% by weight of an organo-phosphorus compound based on the weight of said resin particles, said organo-phosphorus compound containing two or more phosphonic acid or alkali metal phosphonate groups per molecule prior to the grinding step, wherein said anionic polymeric dispersing agent is present in the amount of at least 1.5% by weight based on the weight of said resin particles.

4,034,129

METHOD FOR FORMING AN INORGANIC THERMAL RADIATION CONTROL

Paul A. Kittle, Gardenville, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Filed July 18, 1975, Ser. No. 597,117

Int. Cl.² B05D *5/06*

U.S. Cl. 427—163 3 Claims

1. A method for producing a two-layer laminate water-based thermal radiation control coating upon a metallic or

metallized substrate which comprises depositing upon the substrate a layer of a semiconductor pigment solution, drying said pigment layer, overcoating the pigment layer with a layer of an alkali metal silicate solution and heat-curing the silicate layer at above ambient temperature.

4,034,130

METHOD OF GROWING PYROLYTIC SILICON DIOXIDE LAYERS

Marian Brisko, and Ewald Eisenbraun, both of Boblingen, Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,258

Claims priority, application Germany, Oct. 3, 1974, 2447224

Int. Cl.² C23C 11/00

U.S. Cl. 427—248 C 7 Claims

1. A method of growing pyrolytic silicon dioxide layers on a heated substrate wherein the resulting charge carrier numbers per cm^2 is less than about 10^{12} comprising mixing nitrosyl chloride and silane in a volume ratio between approximately 4:1 and approximately 50:1 in the presence of a carrier gas, and passing the gaseous mixture over said substrate while maintaining a predetermined substrate temperature.

4,034,131

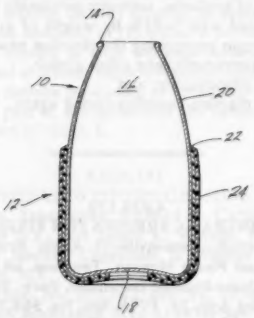
CONTAINER WITH IMPROVED HEAT SHRUNK CELLULAR SLEEVE

Roger R. Rhoads, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 504,111, Sept. 9, 1974. This application Oct. 2, 1975, Ser. No. 618,988

Int. Cl.² B65D 1/02

U.S. Cl. 428—35 22 Claims



1. In an article of manufacture comprising a container having a sidewall and further including a heat shrunk, polymeric seamed sleeve disposed circumferentially outwardly of said sidewall and in snug engagement therewith, the improvement wherein said polymeric sleeve is a composite structure of a closed cellular polyethylene layer and a non-cellular polyethylene layer in adhering contact with said cellular layer, said cellular layer being in engagement with said sidewall and said non-cellular layer being disposed outwardly of said cellular layer.

4,034,132

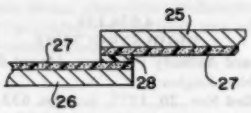
PROPYLENE POLYMER ADHERED TO ENAMEL COATED METAL SURFACE

Ernesto H. Manuel, Park Forest, Ill., assignor to The Continental Group, Inc., New York, N.Y.

Filed Sept. 25, 1975, Ser. No. 616,530

Int. Cl.³ B65D 25/14; C09J 3/14

U.S. Cl. 428—36 11 Claims



1. A method of bonding a propylene polymer to a metal surface which comprises:

a. applying to the metal surface an enamel coating containing a solids mixture of about 70 to about 90% by weight of an epoxy resin, about 5 to about 25% by weight of a urea formaldehyde resin and about 0.1 to 5% by weight of a carboxyl modified polypropylene resin which is the reaction product of polypropylene and an unsaturated dicarboxylic acid or anhydride containing about 0.1 to about 5.0% by weight carboxyl groups,

b. baking the enamel coating to cure and harden the coating,

c. heat sealing a propylene polymer layer to the hardened enamel coating metal surface and then,

d. cooling the heat sealed assembly to ambient temperature.

4,034,133

MAGNETIC RECORDING MEDIUM WITH LUBRICANT

Harry Ronald Fleck, Redwood City, and Charles Philip Mignosa, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 14, 1973, Ser. No. 360,228

Int. Cl.² H01F 10/00

U.S. Cl. 428—64 9 Claims

1. In a magnetic recording element of the type including a base and a coating upon a surface of the base, the coating comprising magnetic particles dispersed in a polymeric binder and a lubricant, the improvement comprising a lubricant chosen from the group consisting of a trifluoride of Ce, La, Pr, Nd, and Sm, said lubricant being present in from 1½% to 50% by weight of the coating.

4,034,134

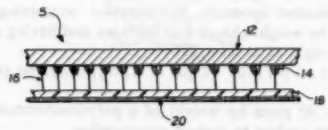
LAMINATES AND COATED SUBSTRATES

Razmic S. Gregorian, Aiken, S.C., and Hans R. Hoernle, Augusta, Ga., assignors to United Merchants and Manufacturers, Inc., New York, N.Y.

Filed Oct. 7, 1975, Ser. No. 620,280

Int. Cl.² B05D 1/14, 1/16; B32B 33/00

U.S. Cl. 428—86 28 Claims



1. A laminate comprising:

a. an air permeable film facing layer; and

b. a substrate backing layer secured to the facing layer by a plurality of uniformly distributed, substantially upstanding flock fibers, one end of substantially all of the flock fibers being permanently embedded in the facing layer

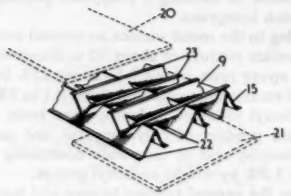
and the other end of substantially all of the flock fibers being secured to the substrate backing layer by a discontinuous layer of a flock adhesive and wherein substantially all of the flock adhesive is present at the tips of the flock fibers which are secured to the substrate backing layer, thereby imparting air permeability to the laminate.

4,034,135

RIGID STRUCTURE

Michael Edward Anthony Passmore, Mount Pleasant, Chiseldon, Wiltshire, England

Filed Nov. 20, 1975, Ser. No. 633,658
Int. Cl.² B32B *3/10, 3/28*
U.S. Cl. 428—184 **10 Claims**



1. A rigid structure comprising a first layer of generally corrugated form and a second layer comprising a plurality of laminae arranged across the said corrugations of the first layer, slots being formed in one side of the corrugated form, the slots extending oppositely on opposite sides from crests of the form on the said one side of the first layer, similar slots formed in the laminae, the slots extending from a one edge of each laminae, the said slots in the laminae and the first layer being so disposed whereby the laminae can interengage with the first layer so as to enable the laminae to engage in the slots in the first layer to lock into the said slots of the corrugation form at an angle to the general plane of the structure.

4,034,136

FLAME-RETARDANT RESIN COMPOSITIONS

Carl Leonard Wright, Pasadena, and Harry Hoyt Beacham, Severna Park, both of Md., assignors to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 95,418, Dec. 4, 1970, Pat. No. 3,936,414, which is a continuation-in-part of Ser. No. 837,911, June 30, 1969, abandoned. This application May 8, 1975, Ser. No. 575,515
Int. Cl.² B32B *15/14;* C08L *71/04*
U.S. Cl. 428—246 **16 Claims**

1. A copper clad laminate comprising (a) a copper sheet, coated with a thermosetting coating comprising:
   1. 10 to 50 parts by weight of a polyunsaturated monomer,
   2. 5 to 30 parts by weight of a polychlorinated or polybrominated aromatic hydrocarbon containing at least 50% by weight chlorine or bromine and having a molecular weight of at least 200,
   3. 20 to 60 parts by weight of a polyphenylene ether polymer,
   4. 0 to 30 parts by weight of a polyunsaturated polymer having carbon to carbon unsaturation,
   5. 2 to 10 parts by weight per 100 parts of all of (1) plus (2) plus (3) plus (4) of a peroxide catalyst which has a ten hour half-life in benzene at a temperature in excess of 100° C

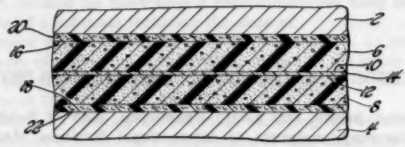
the said coated copper being heated for 2 to 30 minutes at 100° to 170° C prior to being laminated at a temperature of at least 130° C to (b) a base, whereby said thermosetting coating is converted to the thermoset state.

4,034,137

COMPOSITE SHEET STRUCTURE AND METHOD FOR MANUFACTURING SAME

Peter H. Hofer, Grosse Pointe Farms, Mich., assignor to John Z. Delorean Corporation, Bloomfield Hills, Mich.

Filed Dec. 6, 1976, Ser. No. 748,039
Int. Cl.² B32B *3/26*
U.S. Cl. 428—308 **26 Claims**



1. A composite structure comprising two layers of initially liquid permeable material having opposed inner surfaces and having outer surfaces oriented in opposite directions, at least one of said layers being an initially resilient resin foam with open and connected cells, and a thermosetting resinous material which impregnates said layers and which has been cured while maintaining said layers under compression whereby the resinous material is disposed in said layers and therebetween as a continuous and rigid phase, said thermosetting resinous material containing fibrils having a length not in excess of about 1/16 inch.

5. A composite as set forth in claim 1 wherein said thermosetting resinous material also contains hollow glass beads having a diameter less than the length of said fibrils.

4,034,138

AROMATIC POLYAMIDE FIBERS COATED WITH A POLYURETHANE

Eduard P. Babayan, Huntington Beach, Calif., assignor to Hitco, Irvine, Calif.

Division of Ser. No. 429,220, Dec. 28, 1973, abandoned. This application Oct. 9, 1975, Ser. No. 621,005
Int. Cl.² B32B *27/02, 27/34;* D02G *3/40;* D07B *5/00*
U.S. Cl. 428—378 **10 Claims**

1. An article of manufacture comprising high modulus multifilaments of synthetic, aromatic polyamide fibers impregnated and coated with 5-95% by weight of a thermoplastic polyurethane resin comprising the reaction product of:
   a liquid polytetramethylene ether glycol;
   an aliphatic diisocyanate; and
   an aliphatic diamine coupling-curing agent.

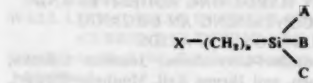
4,034,139

GRAFTED MINERAL CARRIERS FOR FIXING ENZYMES

Honore Mazarguil, Ramonville-St Agne; François Meiller, Palaiseau, and Pierre Monsan, Toulouse, all of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Apr. 16, 1975, Ser. No. 568,796
Claims priority, application France, Apr. 19, 1974, 74.13687
Int. Cl.² B32B *27/14;* B01J *21/00*
U.S. Cl. 428—405 **8 Claims**

1. Grafted mineral carriers comprising oxides, hydroxides or other porous, insoluble mineral compounds having a grain size range of from 40 μ to 5 mm, a specific surface area of from 2 to 600 sq. m/g, a pore diameter of from 50 to 10,000 A and a pore volume of from 0.5 to 1.8 ml/g in which a mineral carrier having hydroxyl groups is grafted with a substituted or unsubstituted haloalkylsilane having the general formula



in which:

X represents a chlorine, bromine or iodine atom;

n is an integer of from 3 to 11;

A, B and C, which are the same or different, are selected from the group consisting of a chlorine atom, a methoxy, ethoxy, methyl or ethyl group, in which at least one of the substituents A, B or C is reacted with an OH group of the carrier.

4,034,140

HEAT-CURABLE SILICONE ELASTOMERS HAVING UNPRIMED ADHESION

Richard L. Przybyla, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed July 31, 1975, Ser. No. 600,692

Int. Cl.² C08L *83/06*; B05D *3/02*

U.S. Cl. 428—447 **15 Claims**

1. A heat-curable composition obtained by mixing components comprising

a. 100 parts by weight of an organic-peroxide-curable organopolysiloxane composition, stable in the presence of moisture and curable with heat to an elastomeric solid, and

b. from 0.1 to 10.0 parts by weight of a room-temperature-curable organopolysiloxane composition having silicon-bonded acetoxy radicals, stable in the absence of moisture and curable in the presence of moisture to a coherent rubbery solid; said room-temperature-curable composition being the only source of silicon-bonded acetoxy radicals in the heat-curable composition, there being sufficient silicon-bonded acetoxy radicals in (b) to provide from 0.03 to 0.3 parts by weight of silicon-bonded acetoxy radicals in every 100 parts by weight of the heat-curable composition comprising (a) and (b), said heat-curable composition having better adhesion to an unprimed surface than does the organic-peroxide-curable organopolysiloxane composition.

13. A method comprising

I. contacting the composition of claim 1 with at least a part of the surface of a substrate within a period of 1 week after said mixing, thereby forming an assembly, and

II. heating the assembly of (I) within a period of one week after said mixing to cure the heat-curable composition thereon and to adhere the heat-curable composition to the substrate, thereby producing an article having adhered to at least a part of the surface of the substrate the cured composition of claim 1.

4,034,141

BROMINATED PHOSPHORAMIDATES

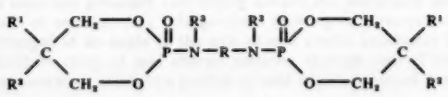
James J. Duffy, Tonawanda; Richard D. Carlson, Grand Island, both of N.Y., and James C. Watson, Florence, S.C., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Division of Ser. No. 537,742, Dec. 31, 1974, Pat. No. 4,007,236. This application May 3, 1976, Ser. No. 682,557

Int. Cl.² B32B *9/02*, *9/04*

U.S. Cl. 428—473 **10 Claims**

1. A method of imparting fire retardant properties to a combustible material, which comprises treating said material with a fire retardant amount of a compound of the structure:



wherein

R^1 and R^2 are independently selected from the group consisting of hydrogen, chloro, bromo and chloro or bromo substituted alkyl of from 1 to 8 carbon atoms;

R^3 is selected from the group consisting of hydrogen, alkyl of from 1 to 8 carbon atoms, hydroxy substituted alkyl of from 1 to 8 carbon atoms and chloro or bromo substituted alkyl of from 1 to 8 carbon atoms, and

R is selected from the group consisting of alkylene of from 2 to 8 carbon atoms, phenylene, biphenylene and dicyclohexylene; provided that at least one of R^1 and R^2 contains a bromine atom.

4,034,142

SUPERALLOY BASE HAVING A COATING CONTAINING SILICON FOR CORROSION/OXIDATION PROTECTION

Ralph Julius Hecht, West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 31, 1975, Ser. No. 645,763

Int. Cl.² B32B *15/00*

U.S. Cl. 428—678 **15 Claims**

1. An article suitable for use at elevated temperature which comprises:

a. a superalloy base material

b. a coating on the superalloy base material having a composition of from about 10 to about 45% chromium, from about 6 to about 25% aluminum, from about .1 to about 0.7% of an oxygen active element selected from the group consisting of the Group III B elements, the lanthanides, the actinides, and mixtures thereof, from about 0.5 to about 7% silicon, balance selected from the group consisting of nickel, cobalt and iron and mixtures thereof, said silicon being present in elemental form in solid solution,

said coating tending to form an external continuous layer composed predominately of alumina.

4,034,143

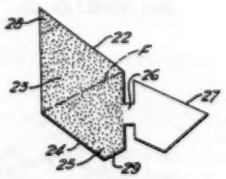
THERMAL DEFERRED ACTION BATTERY WITH INTERCONNECTING, FOLDABLE ELECTRODES

Roger G. Sweet, New Canaan, Conn., assignor to Catalyst Research Corporation, Baltimore, Md.

Filed Feb. 24, 1960, Ser. No. 10,798

Int. Cl.² H01M *6/36*

U.S. Cl. 429—112 **3 Claims**



1. A thermal cell electrode composed of a thin metal sheet in the form of two laterally spaced members integrally connected at adjacent edges by a strip, a first of said members being in the shape of a pair of isosceles triangles joined through their bases and in which the apex of the equal sides of one of said triangles is truncated, and the other of said members defining a truncated triangle smaller than the truncated portion of said first member.

4,034,144

SEPARATOR FOR SECONDARY ALKALINE BATTERIES

Roland F. Chireau, Quaker Hill, Conn., assignor to Yardney Electric Corporation, Pawcatuck, Conn.

Filed July 27, 1976, Ser. No. 709,136
Int. Cl.² H01M 2/16
U.S. Cl. 429—144 17 Claims

1. In a rechargeable alkaline electrochemical cell comprising a positive electrode, a negative electrode, a main separator disposed between said positive and negative electrodes, and an alkaline electrolyte in contact with said electrodes and said main separator, the improvement which comprises:

a negative interseparator disposed in said electrolyte between said main separator and said negative electrode and comprising

a. an inorganic fibrous titanate material, and

b. an inorganic fibrous matrix-forming material having a length and flexibility sufficient to form a matrix for said titanate material,

said titanate material being present in an amount between about 50% and about 95% by weight of the weight of said (a) and (b), and said matrix-forming material being present in an amount sufficient to make up 100% by weight of said (a) and (b).

4,034,145

ANAEROBICALLY HARDENING ADHESIVES AND SEALANTS CONTAINING AN ORGANIC PERCARBOXYLIC ACIDS

Werner Gruber, Dusseldorf-Gerresheim; Joachim Galinke, Dusseldorf-Holthausen, and Jürgen Keil, Monheim-Hitdorf, all of Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf, Germany

Filed Aug. 25, 1975, Ser. No. 607,898
Claims priority, application Germany, Sept. 2, 1974, 2441943
Int. Cl.² C08F 120/12, 120/20
U.S. Cl. 526—328 10 Claims

1. In an aerostable, anaerobically-setting adhesive composition comprising a polymerizable (meth) acrylate ester as principal latent adhesive component, a peroxide polymerization catalyst therefor and an organic polymerization accelerator: a small but effective uniformly distributed amount of a compound selected from the group consisting of the aliphatic and aromatic percarboxylic acids homogeneously dispersible in said composition as agent improving the storage stability of said composition in the presence of molecular oxygen.

4,034,146

METHOD AND APPARATUS FOR EQUALIZING THE WALL LINING WEAR IN THREE PHASE ALTERNATING CURRENT ELECTRIC ARC FURNACES

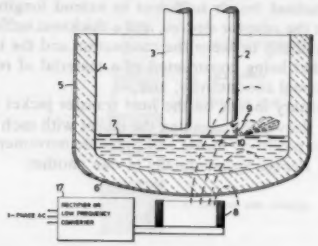
Sven-Einar Stenkvist, Ormbergssvangen 10, 724 62 Vasteras, Sweden

Filed Jan. 27, 1976, Ser. No. 652,660

Claims priority, application Sweden, Jan. 28, 1975, 7500812

Int. Cl.² H05B 7/20

U.S. Cl. 13—11 11 Claims



5. An apparatus for equalizing the wear of the wall lining in a three-phase AC electric arc furnace, including means for creating a magnetic field arranged substantially symmetrically to the electrodes and intersecting the arcs in the furnace space above the charge, the apparatus comprising at least one electromagnetic coil mounted under the furnace bottom lining and means for supplying an electric current to said coil of a polarity which is unchanged during a period of time substantially exceeding the time period of one complete cycle of the electrode supply current.

4,034,147

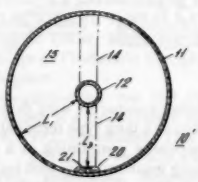
CONTAMINATION CONTROL DEVICE

Robert M. Clark, Ligonier, and John C. Cronin, Greensburg, both of Pa., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Feb. 25, 1976, Ser. No. 661,122

Int. Cl.² H01B 9/04

U.S. Cl. 174—14 R 19 Claims



1. A contamination control device for trapping charged particles in an electrical transmission bus including an elongated center conductor coaxially mounted within a cylindrical conductive shell, said device comprising: an elongated conductive member electrically connected to said shell to maintain said member at a value of electrical potential essentially equal to an electrical potential on said shell, thereby to form a region having a low electrical field intensity within a volume bounded by said member and said shell; said member having a pair of longitudinally opposed ends; a pair of generally tapering side portions being formed at at least one of said pair of ends and generally converging toward the associated end, each of said tapering side portions forming an entranceway arranged at an angle to the axis of said center conductor to facilitate entry of said charge particles through one of said entranceways and into a portion of said region removed from said entranceways whereby said particles are trapped within said region.

4,034,148

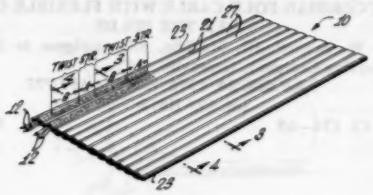
TWISTED PAIR MULTI-CONDUCTOR RIBBON CABLE WITH INTERMITTENT STRAIGHT SECTIONS

Donald D. Lang, Garden Grove, Calif., assignor to Spectra-Strip Corporation, Garden Grove, Calif.

Filed Jan. 30, 1975, Ser. No. 545,582

Int. Cl.² H01B 7/08, 11/04

U.S. Cl. 174—34 11 Claims



1. A laminated multi-conductor cable, which comprises:

a plurality of laterally spaced, longitudinally extending, insulated wire conductor pairs, each of said longitudinally extending insulated conductor pairs having alternating twisted portions and straight portions;

a first laminating plastic film completely underlying said spaced insulated conductor pairs; and

a second laminating plastic film completely overlying said spaced insulated conductor pairs and being laminated to said first plastic film at least at nip areas extending laterally between said alternating twisted portions and straight portions of each of said spaced conductor insulated pairs, said first and second laminated films tightly surrounding each of said alternating twisted portions and straight portions of each of said spaced insulated conductor pairs and forming longitudinally extending encapsulating ducts for said alternating twisted portions and said straight portions of each of said spaced insulated conductor pairs to thereby precisely space each of said spaced conductor pairs along their entire lengths within said laminated cable.

4,034,149

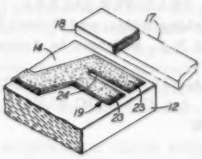
SUBSTRATE TERMINAL AREAS FOR BONDED LEADS

Vincent Joseph Zaleckas, Union, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,136

Int. Cl.² H05K 1/10

U.S. Cl. 174—68.5 4 Claims



1. An article comprising:

an insulating substrate having a conductive pattern thereon, the conductive pattern extending into at least one bond site on the surface of the substrate, the conductive pattern at the bond site including at least two conductive surface areas with at least one opening in the continuity

of the conductive surface areas located between said conductive surface areas; and

a lead having one of its ends bonded to the conductive pattern at the bond site in a thermo-compression bond, and lead being joined to each of the conductive surface areas with heat and metal-deforming pressures, the lead spanning the opening in the continuity of the conductive surface areas of the pattern to provide a plurality of distinct thermo-compression bonds between the lead and the substrate to enhance the pullout strength between the lead and the substrate.

4,034,150

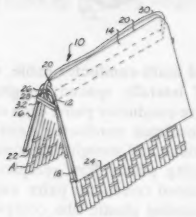
ACCORDIAN FOLD CABLE WITH FLEXIBLE CLIPS OVER THE FOLDS

Jack W. Burnett, III, Mauldin, S.C., assignor to Southern Weaving Company, Greenville, S.C.

Filed Feb. 20, 1976, Ser. No. 659,775

Int. Cl.² H01B 7/06

U.S. Cl. 174—69 **9 Claims**



1. In combination, an accordion-fold cable having a plurality of conductor wires, said cable being folded to define an open-loop configuration at each fold thereof, a flexible clip device carried over a fold comprising:

opposing inclined side portions convergently extended and terminating at a joint section;

remote ends of said opposing side portions being spaced apart and arranged over a fold of said accordion cable with an apex of said open loop of said fold being nested adjacently within said joint section;

fastening means securing and maintaining said apex of said fold in said nested position within said joint section reducing the tendency of said fold to remove from said clip member during an expansion of said cable; and

said opposing side portions being flexible inwardly and outwardly relative to each other so as to impart a retracting force to said cable following an expansion thereof;

whereby said cable may be maintained in its accordion fold configuration.

4,034,151

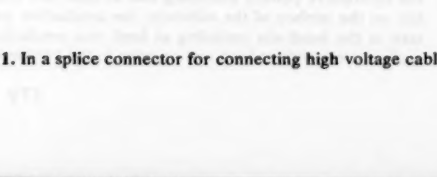
SPLICE CONNECTOR WITH INTERNAL HEAT TRANSFER JACKET

Frank A. Silva, Basking Ridge, and Robert W. Mayer, Hackettstown, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed May 14, 1975, Ser. No. 577,558

Int. Cl.² H02G 15/08

U.S. Cl. 174—73 R **20 Claims**



1. In a splice connector for connecting high voltage cables, each cable having a conductor, insulation surrounding the conductor and a shield around the insulation, the connector including a pair of adaptor sleeves for placement of one sleeve at the terminus of each cable, means for connecting bared portions of the conductors together and a housing for placement over the adaptor sleeves and connecting means to engage the adaptor sleeves along an interface between each sleeve and the housing and to enclose the connection between the bared portions of the conductors, the improvement comprising:

a heat transfer jacket for placement over the connection between the bared portions of the conductors and having a longitudinal length sufficient to extend longitudinally between the adaptor sleeves, and a thickness sufficient to extend radially between the connection and the housing, said jacket being constructed of a material of relatively high thermal conductivity; and

complementary means on the heat transfer jacket and the adaptor sleeves for engaging the jacket with each adaptor sleeve to positively locate and preclude movement of the adaptor sleeves longitudinally to one another.

4,034,152

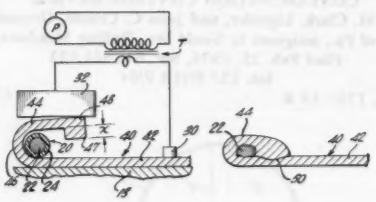
TERMINATION SYSTEM FOR FUSING ALUMINUM-TYPE LEAD WIRES

Allan S. Warner, 50 Haliday St., Clark, N.J. 07066

Continuation of Ser. No. 370,679, June 18, 1973, abandoned, which is a continuation of Ser. No. 220,939, Jan. 26, 1972, abandoned. This application Dec. 3, 1975, Ser. No. 637,253

Int. Cl.² H01R 43/02, 11/06; B23K 11/18

U.S. Cl. 174—94 R **2 Claims**



1. A method of fusing conductor wire that includes aluminum or aluminum alloy to a tang type terminal having an interconnected body comprising positioning at a designated wire position within the tang insulated wire that includes aluminum or aluminum alloy; heating the tang, body and wire with a fusing electrode enough to soften the tang beyond its metallic memory and to burn away insulation on the wire to expose the surface thereof but not enough so that the tang reaches its plastic state and concurrently applying pressure to the tang to join the tang to the body and to join the wire thereto by a thermocompression surface adhesion contact; and controlling that portion of the pressure applied to the wire when softened so that the pressure applied to the wire is insufficient to sever or excessively reduce the cross-section of the wire; and wherein said step of controlling the pressure comprises positioning an enlarged mass of terminal material between the tang and body and opposite from the inter-connection relative to the designated wire position prior to said heating step and spacing said mass from one of said tang and body such that said mass engages both said tang and body during said pressure-applying step.

2. An article made by the method of claim 1.

4,034,153
ELECTRICAL CABLE FOR TRANSPORT VEHICLES AND SHIPS

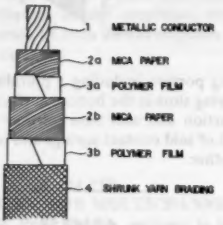
Werner Andres, Muttenz; Ernst Diehl, and Werner Marti, both of Breitenbach, all of Switzerland, assignors to Schweizerische Isola-Werke, Breitenbach, Switzerland

Filed Aug. 15, 1975, Ser. No. 604,938

Claims priority, application Switzerland, Nov. 18, 1974, 15325/74; Austria, Feb. 4, 1975, 816/75

Int. Cl.² H01B 7/00

U.S. Cl. 174—120 SR **13 Claims**



1. In a flexible electrical cable comprising a flexible conductor made from metal selected from the group consisting of aluminum, copper, nickel-plated copper and tin-plated copper, and a flexible insulation covering the conductor, the improvement wherein said flexible insulation comprises:

A. at least four alternately disposed layers, at least two of said layers being spirally wound layers of mica tape, said mica tape (a) being made from mica paper and a heat resistant fiber sheet which is stable to temperatures up to at least 300° C., and (b) being impregnated with an adhesive silicone resin which resin remains flexible after curing, and the other two of said alternating layers each being a layer of a heat-resistant plastic film wound in overlapping relation onto a corresponding one of said two spirally wound layers of mica tape, with the overlapping regions of said film adhering to one another, and

b. a cover-braiding of shrinkable yarn over the outermost layer of plastic film.

4,034,154
DEVICE FOR REDUCING THE RADIO AND AUDIBLE NOISE CAUSED BY CORONA ON HIGH VOLTAGE ELECTRICAL INSTALLATIONS

Albert Pierre Marie Lecat, Rixensart, Belgium, assignor to Laboratoire Belge de l'Industrie Electrique (LABORELEC), Linkebeek, Belgium

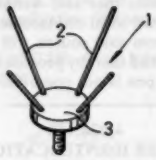
Continuation-in-part of Ser. No. 497,449, Aug. 14, 1974, abandoned, which is a continuation-in-part of Ser. No. 279,157, Aug. 9, 1972, abandoned. This application Dec. 11, 1975, Ser. No. 639,686

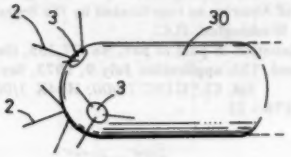
Claims priority, application Belgium, Aug. 17, 1971, 107129

Int. Cl.² H01B 5/00

U.S. Cl. 174—127 **4 Claims**

1. In combination, a high voltage member and a device for reducing the radio and audible noise caused by corona, said device comprising an electrically conductive member in the form of a conductive flat nonperforate disc with a mounting means extending from one flat side thereof, said mounting means and said disc being in substantial electrical contact with the high voltage member, and a plurality of electrical projecting portions projecting from a second flat side of said disc in fan order with their ends remote from the mounting means and being substantially evenly spaced from each other and having radii of curvature that are small relative to their lengths, said projecting portions having lengths such that, during the use of the combination, the ends of the projecting portions remote from the mounting means are located in a well-defined zone of electrical field around said high voltage member where the local electric field has a magnitude such that the usual distrubing ionization mode of the surrounding air is replaced by a new ionization mode producing substantially no radio or audible noise and characterized by stable, small bright spherical glows which are observable in the dark at the ends of said projecting portions.





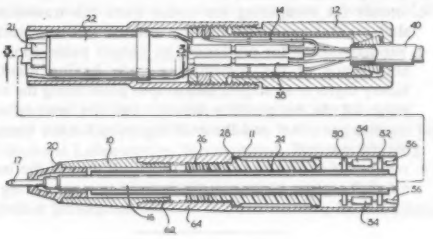
4,034,155
ELECTRICAL SENSING WRITING PEN

Alex Marcel Muller, and Joseph Leslie Tyrrell, both of Palos Verdes, Calif., assignors to Telautograph Corporation, Los Angeles, Calif.

Filed Apr. 19, 1976, Ser. No. 677,872

Int. Cl.² G08C 21/00; H04N 1/00

U.S. Cl. 178—19 **14 Claims**



11. A writing pen capable of sensing an electrostatic field near its writing tip comprising:

a. a writing tip for sensing said electrostatic field;

b. a cylindrical member electrically coupled to said writing tip for re-radiating the electrostatic field sensed by said writing tip, said member having an outer surface;

c. A tubular member coaxially surrounding said cylindrical member so as to capacitively couple the re-radiated electrostatic field from the tubular member to the cylindrical member;

d. electronic amplification means coupled adjacent said outer surface of said cylindrical member, said amplification means electrically coupled to said cylindrical member, and adapted to electronically amplify the signal induced by the coupled electrostatic field;

e. housing means operable for electrostatically shielding said cylindrical member, said tubular means and said amplification means and for exposing said writing tip to said electrostatic field.

f. switch means comprising a light emitting source and a

light detecting means, said switch means disposed within said housing means such that some part of said cylindrical member will, upon inward axial displacement of said cylindrical member, obstruct the passage of light from said source to said detecting means and thereby provide electrical indication that said writing pen is operable, while upon outward axial displacement of said cylindrial member, light from said source will impinge upon said detecting means and thereby provide electrical indication that said writing pen is not operable.

4,034,156

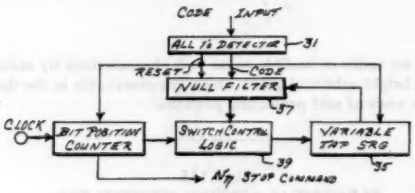
APPARATUS FOR THE IDENTIFICATION OF FEEDBACK TAPES IN A SHIFT REGISTER GENERATOR

Robert R. Willmore, Millersville, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 77,355, Oct. 1, 1970, abandoned. This application July 9, 1973, Ser. No. 377,170

Int. Cl.[2] G11C *19/00*; **H04K** *3/00*

U.S. Cl. 178—22 **4 Claims**



1. An apparatus for determining the feedback tap position of a transmitting binary code shift register generator, comprising:

a. an internal shift register generator, each stage thereof having a controllable feedback tap to the first tap thereof;

b. a bit position counter;

c. means for comparing the codes from the transmitting shift register generator and the internal shift register;

d. register means for producing an output pulse upon the occurrence of the transmitting code having identical binary digits in all stages, said output pulse being the reset pulse for the bit position counter and the internal shift register generator and the enabling pulse for the comparing means; and

e. means for activating selected feedback taps of the internal shift register generator, the activating means being fed by the bit position counter and the comparing means.

4,034,157

TEST JACK FOR MOUNTING ON PRINTED CIRCUIT BOARDS

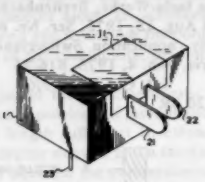
Eugene R. Hrdlicka, Schiller Park; George J. Vincolese, and John H. Szuberla, both of Elmhurst, all of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 2, 1975, Ser. No. 609,279

Int. Cl.[2] H04M *3/26*

U.S. Cl. 179—1 PC **3 Claims**

1. A telephone test jack adapted for mounting on a printed circuit card and adapted to receive a male type test plug, said jack comprising: a base portion of insulating material including a shoulder portion extending upward from a portion of said base, a plurality of parallel spaced contact spring receiving slots included in the upper surface of said base portion and a plurality of openings in the bottom surface of said base, each of said openings connected to a different one of said slots; a plurality of electrically conductive contact springs each including a printed circuit card terminal and a test plug engaging end, and each mounted in a different one of said base portion slots with said printed circuit card terminal portion extending through a different one of said base portion surface openings; and a spring retaining portion of insulating material positioned on top of said base portion and within said shoulder portion,



said retaining portion including a plurality of parallel spaced spring receiving slots in the bottom surface thereof; said spring retaining portion and said base portion in combination supporting each of said contact springs and insulating said springs from each other.

4,034,158

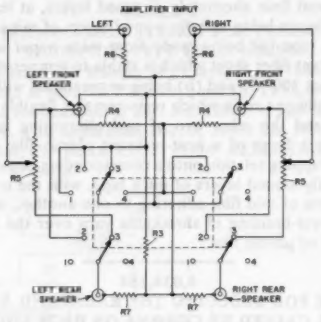
QUADRAPHONIC PASSIVE FOUR-CHANNEL DECODER

Berdette O. Britton, P.O. Box 18044, Dallas, Tex. 75218

Filed Dec. 5, 1972, Ser. No. 312,307

Int. Cl.[2] H04R *5/00*

U.S. Cl. 179—1 GQ **1 Claim**



1. A decoding network for use in a quadraphonic sound system connected between the left and right outputs of a stereophonic amplifier and at least four acoustic transducers, the respective left and right audio output signals of that amplifier each having signal components in phase with one another and also signal components out of phase with the corresponding signal components of the other, comprising

means for applying said left audio output signal from said left amplifier output to a left pair of said acoustic transducers,

means for applying said right audio output signal from said right amplifier output to a right pair of said acoustic transducers,

means connecting the first of said left pair and the first of said right pair of transducers in series with said left and right amplifier outputs so that said first transducer of each pair responds primarily to the mutually out-of-phase components of the respective applied audio signals,

means connecting the second of said left pair and the second of said right pair of transducers respectively across the respective said left and right amplifier outputs,

trap means comprising a pair of series connected resistors, said resistors, said resistor pair being center tapped, and said resistor pair being connected in series between the high sides of only said second left and right transducers, whereby the out-of-phase components of the left and

right audio signals substantially cancel each other out and are not reproduced by said second transducers,

a differentiating network coupled between said transducer series connecting means and ground so that each one of said series connected first pair of acoustic transducers is responsive to its out-of-phase component and to a portion of its respective in-phase component of the audio signal applied thereto, and

a switch for selectively connecting said resistor center tap to ground, whereby, when the center tap is connected to ground, there is provided an in-phase amplifier load sufficient to permit application of only the out-of-phase signal component and only to said second transducers, without destructive oscillation of the amplifier, such that the presence or absence of such an out-of-phase signal component may be detected.

4,034,159

SWITCHING SYSTEM FOR MULTICHANNEL LINES

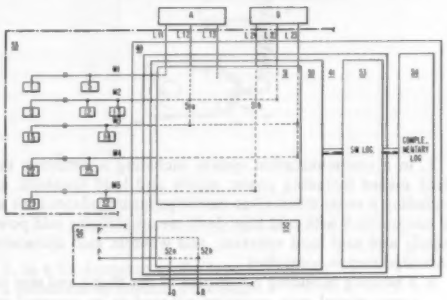
Rene Henri Buron, St. Paul, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 19, 1974, Ser. No. 490,142

Claims priority, application France, July 20, 1973, 73.26959

Int. Cl.[2] H04Q *11/00*

U.S. Cl. 179—15 AT 2 Claims



1. In a switching system providing space division interconnection of multiplex lines in independent groups wherein no line of any group formed by a specific interconnection participates in any other group,

a first matrix comprising storage element arrays equal in number to the maximum number of independent groups, each array having storage elements corresponding to said lines for indicating the connected status of respective lines in said group,

an additional storage array having storage elements corresponding to said lines for indicating a proposed new connection of said lines,

and logic means for comparing, one array at a time, the arrays of said first matrix with said additional array,

a set of latches for recording, by first matrix array, coincidence between at least one element of corresponding first matrix arrays and said additional array,

a second matrix comprising storage element arrays corresponding to said latches, each said second matrix array having an ordered series of storage elements corresponding to multiplex channels of said lines for indicating use status of said channels,

and logic means responsive to said latches to compare said second matrix arrays, selectively according to the state of said latches, and to provide signals indicative of those orders wherein more than one channel is in use.

4,034,160

SYSTEM FOR THE TRANSMISSION OF SPEECH SIGNALS

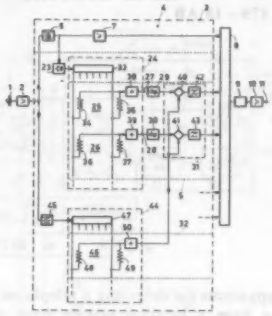
Petrus Josephus Van Gerwen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 5, 1976, Ser. No. 664,409

Claims priority, application Netherlands, Mar. 18, 1975, 7503176

Int. Cl.[2] G10L *1/00;* H04B *1/66*

U.S. Cl. 179—15.55 R 24 Claims



15. A receiver for band compressed speech signals comprising a band expander including a baseband channel, a plurality of a sub-band expander channels, means having an input coupled to said baseband channel and an output coupled to said expander channels for generating components in said subbands, a frequency analyzer coupled to said component generator and having for each sub-band first and second subbandpass filters with the same amplitude-frequency characteristics and differing phase frequency characteristics, and a modulator circuit having a first input means for receiving a constant amplitude signal from said component generator, a second input means for receiving reference phase and amplitude data, and an output means for supplying a portion of the original speech signal.

4,034,161

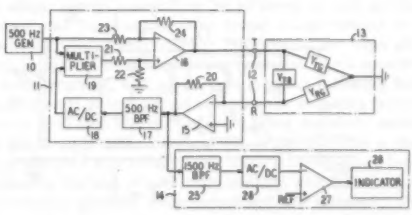
TELEPHONE RECEIVER-OFF-HOOK DETECTOR

Richard Scott Hoppough, Greensboro, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 28, 1976, Ser. No. 700,329

Int. Cl.[2] H04M *3/22*

U.S. Cl. 179—18 AB 3 Claims



1. Apparatus for detecting a telephone receiver-off-hook condition from a location remote from the telephone but interconnected therewith by a transmission line, said apparatus comprising:

a source of alternating signals,

means for use at said location for applying to said transmission line said signals set to an amplitude level related to the loading effect of said transmission line, and

means for use at said location for producing an output when

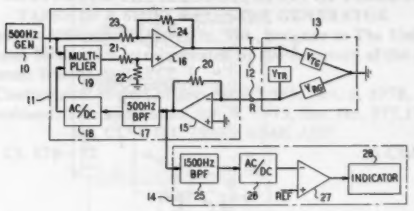
a signal having a frequency harmonically related to the frequency of said alternating signal and exceeding a predetermined amplitude is present on said line.

4,034,162

TELEPHONE RECEIVER-OFF-HOOK DETECTOR

James Tyler Holt, Elon College, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 28, 1976, Ser. No. 700,330
Int. Cl.² H04M *3/22*
U.S. Cl. 179—18 AB **5 Claims**



1. In apparatus for detecting a telephone receiver-off-hook condition from a location remote from the telephone but interconnected therewith by a transmission line where said apparatus comprises first means for use at said location for applying to said transmission line an amplitude-controlled test signal where the amplitude is related to the loading effect of said transmission line, and second means for use at said location for producing an output when a signal having a frequency harmonically related to the frequency of said test signal and exceeding a predetermined amplitude is present on said line, an improvement characterized in that:

said first means produces, for application to said transmission line, a second alternating signal having a frequency different from said test signal, and

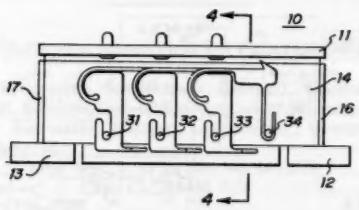
said first means is responsive to current produced by said second signal to control the amplitude of said test signal.

4,034,163

APPARATUS FOR MECHANICALLY OPERATING PUSH BUTTONS

Wilbur R. Youngs, Dallas, Tex., assignor to Zip-Call, Inc., Allen, Tex.

Filed Jan. 7, 1976, Ser. No. 647,218
Int. Cl.² H04M *1/48*
U.S. Cl. 179—90 CS **10 Claims**



1. A device for selectively actuating keys in an array of columns and rows by use of a perforated card comprising:

a. a frame adapted to overlay said keys,

b. partition means in said frame defining slots in number equal to the number of said keys which slots extend normal to the plane of said array and parallel to the length of said rows, and

c. actuators each having an upfacing upwardly urged hook mounted to operate such that there is one in each of said slots, each actuator being pivotally mounted and having a bottom foot to contact one of said keys,

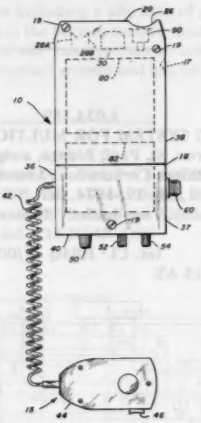
whereby a perforated card moved along the top of said frame in the direction of the length of said slots with perforations therein selectively engages and moves said hooks to rotate said actuators for depression of said keys.

4,034,164

CITIZENS BAND CARTRIDGE FOR TAPE DECKS

Randy C. Westmoland, Box 92, Skiatook, Okla. 74070

Filed Aug. 25, 1975, Ser. No. 607,184
Int. Cl.² G11B *31/00*
U.S. Cl. 179—100.11 **8 Claims**



1. In a communication system including a cartridge tape deck means including power supply and loud speakers, and including a radio transceiver cartridge means adapted for use in conjunction with said tape deck means utilizing said power supply and said loud speakers; and wherein said transceiver cartridge means comprises

a. a housing including a first part of the shape and size of a conventional tape cartridge adapted to be inserted into said tape deck; and a second part of selected dimensions extending to the front of said tape desk;

b. a plurality of openings in the end of said first part including:

1. a first opening including therein two contacts adapted to contact the conventional two contacts inside said tape deck, whereby power can be drawn from said conventional two contacts to power said transceiver;

2. a second opening including therein magnetic transducer means for transducing magnetic signals into the pickup magnetic head in said deck;

3. A third opening to provide clearance for the tape drive wheel in said deck;

c. radio transceiver means in said housing;

d. control means for said transceiver means;

e. microphone/loud speaker means connected to said transceiver cartridge means; and

f. means to connect antenna means to said transceiver cartridge means, and including

g. means in said cartridge tape deck means to apply power to said transceiver cartridge means, whereby when said radio transceiver cartridge means is inserted into said tape deck means and said antenna means is connected, said transceiver cartridge means receives power from said tape deck means and plays out through said loud speakers, and when said transceiver cartridge means is removed from said tape deck, and separate power is sup-

plied, said transceiver cartridge means can be used independently of said tape deck means; and further including

h. a transceiver cartridge receptacle means into which said transceiver cartridge means can be inserted; and including in said transceiver cartridge receptacle means:

1. batteries; and

2. extensible antenna means.

4,034,165

TRANSDUCER WITH REARWARDLY DISPOSED DAMPING ELEMENTS

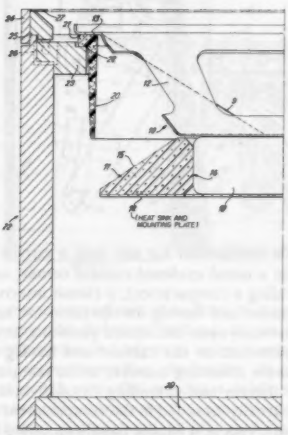
Gert Wilhelm Haeder, Schmitten, Germany, assignor to The Rank Organisation Limited, London, England

Filed Jan. 12, 1976, Ser. No. 648,516

Claims priority, application United Kingdom, Jan. 22, 1975, 2765/75

Int. Cl.² H04R *1/02, 1/28, 9/02*

U.S. Cl. 179—115.5 R **13 Claims**



1. In a loudspeaker of the type comprising:

a substantially conical diaphragm,

support means for said diaphragm, and

means for causing said diaphragm to vibrate in dependence on a varying electrical input signal fed to said loudspeaker, whereby said diaphragm radiates acoustic vibrations forwardly from one face and rearwardly from the other face,

the improvement wherein, there is provided a frusto-conical annular damping element of cellular material mounted on said support means of said loudspeaker in a position such as partly to absorb and partly to radially outwardly deflect acoustic vibrations directed rearwardly from said disphragm.

4,034,166

TRANSMISSION NETWORKS FOR TELEPHONE SYSTEM

John Edward Hollis, High Wycombe, England, assignor to Plessey Handel und Investments A.G., Zug, Switzerland

Filed Nov. 25, 1975, Ser. No. 635,039

Claims priority, application United Kingdom, Nov. 27, 1974, 51306/74

Int. Cl.² H04B *1/58*

U.S. Cl. 179—170 NC **2 Claims**

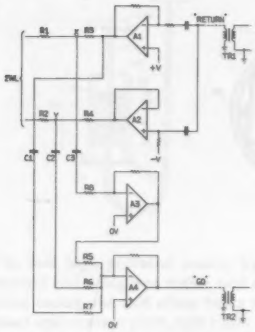
1. A terminating set of the kind providing for the coupling of go and return speech paths to a 2-wire speech circuit characterised in that,

a. the return path includes a first and a second operational amplifier and the go path includes a third and a fourth operational amplifier, said third and fourth amplifiers have preselected gains,

b. said first and second amplifiers extend return path balanced speech currents to said 2-wire speech circuit over a resistor network comprising first and second identical branches each having an identical internal tapping point,

c. the tapping point of said first branch is connected over a first capacitor to the input path of said third amplifier,

d. the tapping point of the second branch is connected over a second capacitor and a first input resistor to said fourth amplifier,



e. the output path of said third amplifier is connected over a second input resistor to said fourth amplifier,

f. the output path of the first amplifier is connected over a third capacitor and a third input resistor to said fourth amplifier, and wherein said preselected gains of the third and fourth amplifiers is such that balanced speech currents derived from the 2-wire line are extended to the go path whereas common-mode voltage conditions at said tapping points are substantially rejected and not applied to the go path.

4,034,167

TELEPHONE SWITCH RETAINING DEVICE

Albert E. Boyd, 2417 Eastline Drive, Joliet, Ill. 60436

Filed May 24, 1976, Ser. No. 689,597

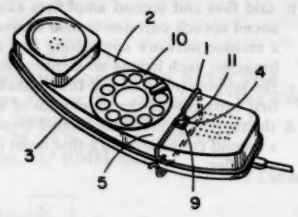
Int. Cl.² H01H *9/22*

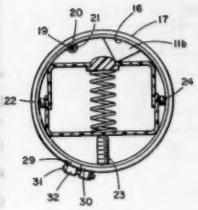
U.S. Cl. 179—178 **8 Claims**

1. A switch retaining device for telephones comprising band means, said band means includes a wire frame member, said wire frame member being shaped to correspond with the cross-sectional shape and dimension of a portion of said telephone which carries a switch to be retained by said device, said wire frame member including detent means formed by a bend of said wire frame member inwardly of the area surrounded by said wire frame member, said wire frame member being stiffly resilient, said wire frame member including first and second ends, said first and second ends including fastening means, said first and second ends being manually moveable towards each other for fastening engagement in a first position, said first and second ends being movable away from each other by the bias of said stiffly resilient wire frame member to a second position when unfastened and released.

6. A switch retaining device for telephones comprising band means, said band means includes a first annular ring member including means to mount around a portion of said telephone which carries a switch to be retained by said device, a second annular ring member being mounted for rotation over and coaxially with said first annular ring member, detent means being carried by said second annular ring member and including a projecting member which projects inwardly toward the central axis of said coaxially mounted ring members, slot means in said first annular ring member to receive said projecting member carried by said second annular ring member

therethrough for movement between a first position and a second position, said second annular ring member being manually rotatable on said first annular ring member to move said projecting member between said first and second positions.



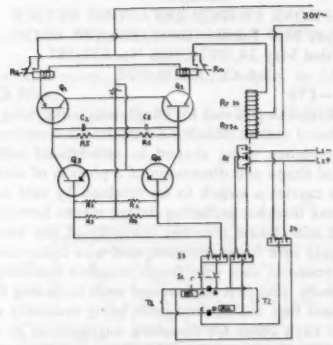


4,034,168

DEVICE TO DETECT AND AUTOMATICALLY CONTROL ELECTRICAL POTENTIAL POLARITIES

Robert Kenneth Brown, 147 Marine Drive, Apt. 5-D, Buffalo, N.Y. 14202

Filed Dec. 2, 1974, Ser. No. 528,777
Int. Cl.² B60L 9/04
U.S. Cl. 191—2 **10 Claims**



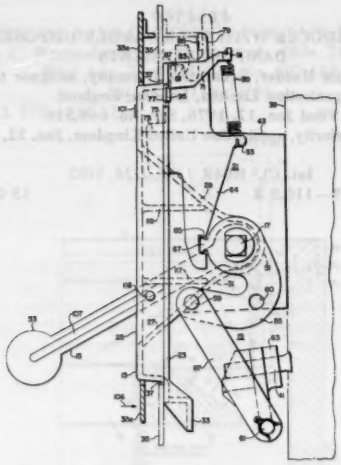
1. An apparatus for detecting differences in polarity between a pair of separate conductors and changing the polarity of one such conductor so as to make both conductors of the same polarity which comprises means for selectively applying the same and different electrical polarities to the conductors, amplifying means and first relay means, means in contact with both such conductors and actuatable when they are of different polarities to impose a potential difference across said amplifying means, said amplifying means producing an amplified potential to operate said first relay means when said potential difference is impressed across it and means coupled to said first relay means for reversing the polarity of one of the conductors so as to make them both of the same polarity.

4,034,169

ELECTRIC SWITCHGEAR DEVICE WITH INTERLOCKING HANDLE MEANS

Donald D. Armstrong, Pittsburgh, Pa., and John R. Wilson, Darien, Ill., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 11, 1975, Ser. No. 612,525
Int. Cl.² H01H 9/22
U.S. Cl. 200—50 A **8 Claims**



1. A handle mechanism for use with a circuit interrupter located within a metal enclosed control center, comprising a cabinet providing a compartment, a circuit interrupter within the compartment and having an operator for actuating the interrupter between open and closed positions, an access door to the compartment on the cabinet and having an opening therein, a handle mounting member in the compartment having a recess therein and extending through said opening, a pivot shaft journally mounted in the compartment and extending through said recess, a handle fixedly mounted on the pivot shaft and operatively connected to the operator and comprising a lever and a link, the lever being fixedly mounted on the pivot shaft, and the link being attached to the lever and to the operator.

4,034,170

ELECTRICAL TRANSFER SWITCHING APPARATUS HAVING DOOR INTERLOCK AND PLURAL SWITCH INTERLOCK

Rodney Dean Raabe, and Ardie Reinhard Dittberner, both of Mankato, Minn., assignors to General Electric Company, New York, N.Y.

Filed Jan. 21, 1976, Ser. No. 651,044
Int. Cl.² H01H 9/20
U.S. Cl. 200—50 A **7 Claims**

1. Transfer switching apparatus for switching an electrical load between alternative sources of electrical power, said transfer switching apparatus comprising, in combination:

A. an enclosure;

B. a first switch mounted within said enclosure and having a first rotary operating mechanism;

C. a first pin carried eccentrically by said first operating mechanism;

D. a second switch mounted within said enclosure and having a second rotary operating mechanism;

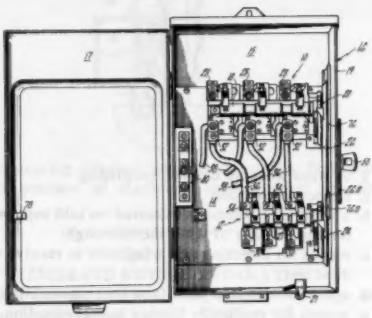
E. a second pin carried eccentrically by said second operating mechanism;

F. an elongated slide mounted within said enclosure for longitudinal reciprocating motion through an intermediate neutral position; and

G. means forming in said slide first and second L-shaped slots in which said first and second pins are respectively accommodated, each said slot including a longitudinally extending slot segment and a transversely elongated slot segment.

1. with said slide in its neutral position, said first and second pins being located in said transverse slot segments of their associated first and second slots and said first and second switches being in their OFF conditions,

2. upon movement of said slide from its neutral position in one direction, said first pin moves solely in its transverse slot segment causing rotation of said first rotary operating mechanism to convert said first switch to its ON condition, while said second pin moves out of its transverse slot segment and through its longitudinal slot segment to idle said second operating mechanism leaving said second switch in its OFF condtion, and



3. upon movement of said slide from its neutral position in the opposite direction, said second pin moves solely in its transverse slot segment causing rotation of said second rotary operating mechanism to convert said second switch to its ON condition, while said first pin moves out of its transverse slot segment and through its longitudinal slot segment to idle said first operating mechanism leaving said first switch in its OFF condition.

3. The transfer switching apparatus defined in claim 1, which further includes:

A. a door for said enclosure;

B. a catch carried by said door; and

C. means carried by said slide engaging said catch to preclude opening said door while slide is in any position other than its neutral position.

4,034,171

MEANS FOR ENERGIZING A COLOR TELEVISION PICTURE TUBE DURING MANUFACTURE

Armando V. Marino, Chicago, and Albert Sora, River Forest, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Sept. 30, 1976, Ser. No. 728,333
Int. Cl.² H01H *35/02*
U.S. Cl. 200—51 R **1 Claim**

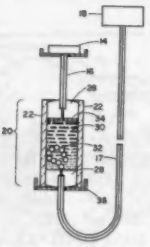
1. For use in the manufacture of a color television picture tube having an envelope containing an electron gun assembly and a base attached to a neck of said envelope, said base having electrically conductive pins connected to elements of said electron gun assembly wherein a first of said pins on said base carries a relatively high focus potential of many kilovolts and a second of said pins carries a substantially higher main focus lens potential, a means for energizing said tube during manufacture comprising:

a socket for coupling with said base on said tube wherein said socket has a lead attached to a source of high potential, said lead being characterized by having a switch comprising:

an electrically nonconductive casing filled with a dielectric fluid,

an electrically conductive contact plate within said electrically nonconductive casing, said contact plate being connected to said socket by a first wire, and

an electrically conductive chain within said electrically nonconductive casing, said chain having a first end



connected to said high potential source by a second wire, said second end being free within said electrically nonconductive casing and said chain being sufficiently long to contact said contact plate, said chain contacting said contact plate when said casing is in a first position wherein said socket is coupled to said base, and

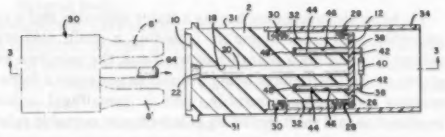
means for supporting said switch in an inverted position after said socket is decoupled from said base of said tube to cause said chain to fall away from said contact plate and thus de-energize said socket.

4,034,172

HIGH VOLTAGE CONNECTOR WITH CROW BAR

Douglas Wade Glover, Harrisburg; Jan Philip Askman, Carlisle, and Henry Otto Herrmann, Jr., Mount Joy, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 19, 1976, Ser. No. 668,356
Int. Cl.² H01R *33/30*
U.S. Cl. 200—51.1 **4 Claims**



1. A connector for mixed voltage signals with an auxiliary positive disablement of dangerous high voltage, comprising:

a first connector block having a plurality of electrical receptacles recessed within protruding insulative sleeves,

a second connector block having a plurality of cavities matingly receiving said insulation sleeves therein,

electrical conductors projecting into said cavities and secured to male electrical contacts for pluggable connection to said electrical receptacles,

said second electrical connector block having a dielectric piston slidably mounted in a piston chamber and having a pair of conductive shorting rods engaging two of said male electrical contacts thereby connecting them together electrically,

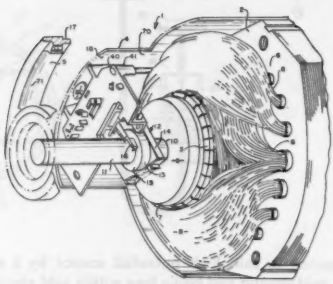
said first connector block having a projecting dielectric plunger insertable in said piston chamber for displacing said piston and disengaging said shorting rods from said corresponding male contacts prior to pluggable connection of said male contacts and said receptacle contacts but after receipt of said sleeves in said cavities.

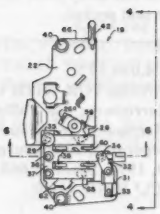
4,034,173

CENTRIFUGAL ACTUATED ELECTRIC MOTOR SWITCH STRUCTURE

William D. Crow; Thomas V. Ottersbach, and Eugene F. Hildebrandt, all of St. Louis, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed June 18, 1975, Ser. No. 587,822
Int. Cl.² H01H 35/10, 1/28
U.S. Cl. 200—80 R 15 Claims





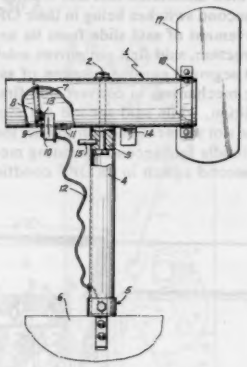
11. In an electric motor having a stator assembly and a rotor assembly, said rotor assembly including a shaft, said stator assembly including a plurality of windings, the selective energization of said windings being utilized to generate a force for rotating said rotor assembly, and a centrifugal actuator mounted to said shaft including at least a part movable relative to said shaft, the improvement which comprises a terminal board for electrically interconnecting said windings to a source of power, said terminal board having a switch assembly attached to it, said switch assembly adapted to interconnect respective ones of said windings to a source of power, said switch assembly comprising conductive means, said conductive means including a base portion, a first conductive member extending outwardly from said base portion, a second conductive member extending outwardly from said base portion, and means responsive to part movement of said centrifugal actuator for alternately engaging and releasing said conductive members, said engaging and releasing means comprising a switch arm having a first end and a second end, said second end being adapted to abut said actuator in at least one position of said switch assembly, said switch arm having a non-conductive body part including means for alternately engaging and releasing said conductive members, release of said conductive members causing electrical energization of the released conductive member, the force applied to said conductive member during energization being independent of any force applied by and to said engaging and releasing means.

4,034,174

WIND WARNING DEVICE

Talmadge W. McCord, Mountain Crest, Guntersville, Ala. 35976

Filed June 2, 1975, Ser. No. 582,697
Int. Cl.² H01H 35/40
U.S. Cl. 200—81.9 R 10 Claims



1. A wind warning device comprising:
a. supporting means;
b. a wind tube rotatably mounted on said supporting means for the passage of wind therethrough;
c. means for directing said wind tube to receive wind of any direction;
d. means within said wind tube for responding to said wind;
e. means for resiliently biasing said responding means to a first position, and
f. switching means connected to said responding means for changing a circuit condition in response to motion of said responding means away from said first position, whereby any wind providing sufficient force within said wind tube to displace said responding means by overcoming bias provided by said resilient biasing means causes said switching means to change said circuit condition.

4,034,175

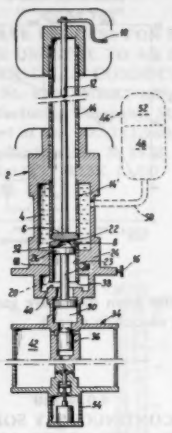
PROTRACTED-BLAST ELECTRIC CIRCUIT-BREAKER FOR ALTERNATING CURRENTS

Jean Louis Gratzmuller, 66, Boulevard Maurice Barres, Neuilly-sur-Seine, France (92200)

Filed Aug. 18, 1975, Ser. No. 605,428
Claims priority, application France, Aug. 27, 1974, 74.29200; July 11, 1975, 75.21809
Int. Cl.² H01H 33/68
U.S. Cl. 200—150 R 10 Claims

1. An electric circuit-breaker for alternating currents: in which the arc extinction chamber containing the fixed and moving contacts is filled with a liquid dielectric consisting of liquefied SF6 gas under pressure; in which, when the circuit-breaker is in the switched-in position, the moving contact bears against the fixed contact solely by axial pressure exerted by thrust-exerting actuating means; and in which said moving contact has an axial passage therethrough which forms a nozzle for centripetal blasting of the liquid dielectric having port adjacent to and between the contacts; said circuit-breaker being characterized in that the moving contact is supported by a first piston which cooperates with a second coaxial or blast piston, the two said pistons sliding one within the other and the assembly formed by said coaxial pistons being slidable within a bore formed through the end-face of the arc extinction chamber; in that each of the pistons has one face in contact with the dielectric under pressure contained in the arc extinction chamber; in that said assembly is controlled by said actuating means and in that stop means limit the travel

of the first piston to less than the travel of the second piston; whereby the blast process is prolonged beyond the instant at



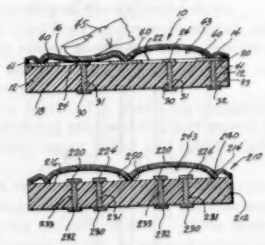
which the moving contact supported by the first piston reaches its position of maximum spacing from the fixed contact.

4,034,176

MEMBRANE SWITCH APPARATUS

Willis August Larson, Mequon, Wis., assignor to Magic Dot, Inc., Minneapolis, Minn.

Filed June 11, 1975, Ser. No. 585,773
Int. Cl.[2] H01H *13/70*
U.S. Cl. 200—159 B **6 Claims**



1. A membrane switch apparatus comprising:

a nonconductive substrate having a planar first surface and an opposite second surface;

first contact means supported on said first surface and comprising a conductive sheet supported on said first surface and having a plurality of apertures formed therein to expose portions of said first surface;

second contact means supported on said first surface laterally spaced from and electrically insulated from said first contact means and comprising at least one contact supported on said first surface within each of said apertures;

flexible membrane means comprising a substantially planar sheet having electrically conductive bridging means formed thereon for selectively providing an electrical connection between said first and second contact means upon deflection, said connductive mens extending adjacent said first and second contact means, said membrane means being supported from said first surface and having a plurality of discrete projections integrally formed therein for maintaining said membrane means in a normally spaced relation with at least one of said first or second contact means and supporting said membrane means on said first contact means and spaced from said second contact means, whereby portions of said membrane may be selectively depressed to electrically couple selected ones of said contact means with said first contact means; and

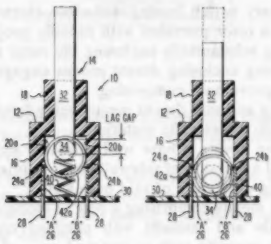
means for electrically coupling said first and second contact means to an electrical circuit.

4,034,177

PLUNGER-ACTUATED, LOST MOTION SWITCH WITH TACTILE FEEDBACK

Dewey M. Sims, Jr., Westland, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 19, 1976, Ser. No. 743,240
Int. Cl.[2] H01H *13/52*
U.S. Cl. 200—159 R **9 Claims**



1. An electrical switch of the class suitable for use in keyboards or the like comprising:

a dielectric switch housing defined by a hollow integral body having first and second pairs of opposed interior walls formed therein and further having an external aperture in communication with the hollow portion of said integral body;

a dielectric base surface supporting said switch housing;

a dielectric plunger defined by a shaft disposed for reciprocal motion within said external aperture and an actuator arm formed integrally with one end of said shaft and disposed within the hollow portion to have its opposed ends adjacent said first pair of opposed interior walls;

terminal means disposed on each of said second pair of opposed interior walls proximate said base surface;

biasing means for urging said plunger toward a rest position distal from said base surface;

electrically conductive annular means, dimensioned and disposed to freely encircle the ends of said actuator arm and to frictionally bear against said second pair of opposed interior walls, for defining a conductive path between said terminal means, whereby the conductive path is effected when said actuator arm is caused to travel against said biasing means from its rest position to a lowermost position proximate said terminal means and the conductive path continues effected until said actuator arm has traversed an initial distance from its lowermost position toward its rest position through a lost motion relation between said plunger and said annular means; and

threshold means disposed on each of said second pair of opposed interior walls for interferring with the travel of said annular means to provide a force threshold for the passage of said actuator arm between its rest position and its lowermost position.

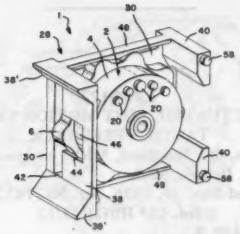
4,034,178
ROTARY SWITCH HOUSING HAVING INTEGRAL FLEXIBLE DETENTING WALLS AND ROTOR MOUNTING STRUCTURE

Gary Jay Koppenheffer, and William Henry Rose, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 621,173, Oct. 9, 1975, abandoned. This application June 2, 1976, Ser. No. 692,174

Int. Cl.² H01H *9/02, 21/00, 19/00*

U.S. Cl. 200—293 **3 Claims**



1. In a rotary switch having moveable electrical contacts mounted on a rotor provided with radially projecting levers and a housing substantially enclosing the rotor and contacts, and the housing enclosing detent means engageable on said rotor, the improvement comprising:

said housing and said detent means being fabricated in one piece from a dielectric material,

said housing having a base wall rotatably supporting said rotor and a plurality of sidewall portions integral with and projecting outwardly of said base wall,

said detent means comprising a pair of elongated and relatively thin and resilient web portions each integrally joined at opposite ends to opposed ones of said sidewall portions,

said web portions extending between said opposite ones of said sidewall portions and resiliently engaging selected levers of said rotor which is disposed between said web portions,

said base wall having therein slots extending lengthwise of said web portions for formation of said web portions in spaced relationship from said base wall, and

axle means rotatably mounting said rotor on said base wall.

4,034,179
METHOD OF MULTIPLE ELECTRODE GAS SHIELDED ARC WELDING

Fusao Koshiga, Kawasaki; Jinkichi Tanaka, and Itaru Watanabe, both of Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

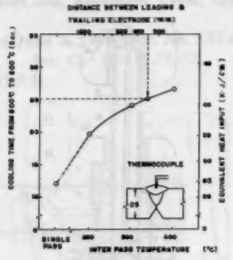
Filed Nov. 17, 1975, Ser. No. 633,020

Claims priority, application Japan, Nov. 26, 1974, 49-135181

Int. Cl.² B23K *9/16*

U.S. Cl. 219—74 **9 Claims**

1. A method of multiple electrode gas shielded arc welding comprising the steps of: mixing gases of at least one inert gas and at least one active gas as shielding gas, and selecting the active gas content of shielding gas fed to leading electrode



means so as to differ from the active gas content of shielding gas fed to trailing electrode means.

4,034,180
METHOD OF CONTINUOUSLY SOLDERING SMALL ELEMENTS ARRANGED GENERALLY IN A LINE BY A CONCENTRATED RADIANT ENERGY SOURCE

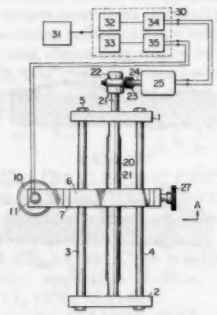
Toshihiko Kobayashi, Mitaka; Tetsusaburo Kanbayashi, Niiza; Satoshi Ichioka; Shinjiro Takeuchi, both of Toda, and Yukinori Matsushima, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Tokyo and Mishima Kosan Co., Ltd., both of, Japan

Continuation of Ser. No. 367,181, June 5, 1973, abandoned. This application May 28, 1975, Ser. No. 582,412

Claims priority, application Japan, June 10, 1972, 47-58077

Int. Cl.² B23K *3/04*

U.S. Cl. 219—85 BM **1 Claim**



1. In a method of successively soldering small elements arranged generally in a line by means of a substantially circular concentrated radiant beam source by successive heating of a region having a length equal to that of the line and a narrow width, the improvement comprising the steps of:

intermittently moving said source along the line by predetermined increments;

operating said source only while movement of said source along said line is stopped to apply radiant energy to the elements in successive circular heating zones along said line;

interrupting operation of said source to interrupt application of said radiant energy to said elements while said source is moved along said line; and

controlling the movement of said source along said line, as a function of the length of time of operating said source to apply said radiant energy and of the current of said source, such that the length of each said predetermined increment of movement is less than the diameter of said

circular heating zones, and thereby partially overlapping said circular heating zones along said line.

4,034,181

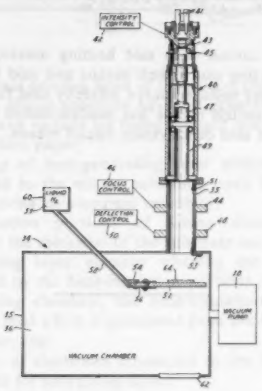
ADHESIVE-FREE PROCESS FOR BONDING A SEMICONDUCTOR CRYSTAL TO AN ELECTRICALLY INSULATING, THERMALLY CONDUCTIVE STRATUM

James R. Packard, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 281,969, Aug. 18, 1972, abandoned. This application Jan. 8, 1975, Ser. No. 539,503

Int. Cl.² B23K *15/00*

U.S. Cl. 219—121 EM 3 Claims



1. An adhesive-free process for forming a light resonant cavity and transparent heat sink suitable for use in an electron beam laser consisting of the following steps:

providing a crystal of a direct band-gap semiconductor having two major broad and plano-parallel faces and a thickness therebetween not greater than approximately 60 micrometers,

forming on a block of a thermally-conductive electrical insulator material selected of either quartz or sapphire a corresponding major broad and substantially planar surface,

positioning a major broad surface of the crystal in contact with the major broad surface of the insulator material,

bombarding the breadth of the opposite major broad surface of the crystal with a swept and pulsed electron beam for a total duration of approximately 15 minutes, said beam having an energy of approximately 40 keV, a beam current of approximately 4 ma and a beam diameter of approximately 50 μm, being swept at a rate of approximately 100 meters/sec over a raster containing approximately 125 lines and being pulsed at a rate of approximately one pulse every 5 microseconds, with each pulse lasting approximately 50 nanoseconds to allow heat produced at a given location in the crystal as the result of a given pulse to be dissipated into the crystal and insulating material during the period between pulses and during the period while the beam is scanned over the remainder of the crystal to avoid appreciable increases in the bulk temperature of the crystal and to ensure that the uniformity of laser characteristics of the crystal are not impaired, a uniform bond thereby being produced over substantially the entire area of the contacted surfaces of the crystal and insulator material without the application of external heat or pressure such that when the bonded crystal and insulator material are utilized in a said electron beam laser, heat generated as a result of electron bombardment during the laser emission is dissipated into the heat sink, enabling the lasing crystal to be in thermal equilibrium such that lasing threshold and wavelength of laser emission is the same over all portions of the crystal.

4,034,182

METHOD OF FABRICATING RINGS FROM SEPARATE SEGMENTS AND FIXTURE FOR USE THEREWITH

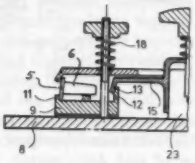
Werner Schlosser, Munich, and Horst Berger, Lochham, both of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Munich, Germany

Filed Dec. 17, 1974, Ser. No. 533,587

Claims priority, application Germany, Dec. 21, 1973, 2363722

Int. Cl.² B23K *15/00*

U.S. Cl. 219—121 EM 7 Claims



1. A method of fabricating self-supporting rings of a particular diameter by welding together separate segments, comprising the steps of:

a. making segments of a size including an allowance for shrinkage so that when the segments are assembled they form a complete ring having a diameter larger than the particular diameter,

b. arranging the individual segments into the shape of a ring within a fixture and without first bonding together any of the segments, the successive segments of the ring being in abutting relationship and the ring being supported only by the fixture,

c. placing the ring and fixture into a vacuum chamber,

d. joining the segments to one another by welding their abutting surfaces together, using an electron beam, without removing the ring from the vacuum chamber until all the segments have been welded,

e. urging all the segments of the ring radially inwardly during the welding operation, and

f. separating the ring from the fixture.

4,034,183

PROCESS FOR THE PRODUCTION OF PLANOGRAPHIC PRINTING FORMS BY MEANS OF LASER BEAMS

Fritz Uhlig, Wiesbaden, Germany, assignor to Hoechst Aktiengesellschaft, Germany

Filed Oct. 8, 1975, Ser. No. 620,756

Claims priority, application Germany, Oct. 10, 1974, 2448325

Int. Cl.² B23K *9/00*

U.S. Cl. 219—122 LM 8 Claims

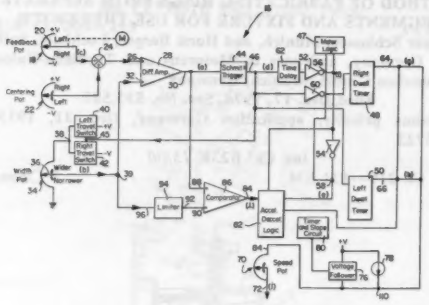
1. In the process for the production of a planographic printing form in which a carrier coated with a hydrophilic layer composed of a non-light-sensitive compound is imagewise exposed, the improvement comprising imagewise exposing the layer to laser radiation of an intensity and for a period such that the exposed areas are rendered hydrophobic and oleophilic, whereby the printing form obtained may be used for printing in a planographic printing machine without further treatment.

4,034,184

WELDING TORCH OSCILLATOR CONTROL SYSTEM

Robert C. Fernicola, Florence, S.C., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 30, 1975, Ser. No. 592,098
Int. Cl.² B23K 9/10
U.S. Cl. 219—124 13 Claims



1. A welding torch oscillator control system including a drive motor, means for rectilinearly reciprocating said torch in response to rotation of said drive motor, and an oscillator circuit for alternately varying the direction of rotation of said drive motor, said oscillator circuit comprising:

first means for providing a DC reference potential the polarity of which is representative of the direction of torch travel;

second means responsive to the rotation of said motor for providing an output signal which varies from a predetermined DC potential of one polarity to another predetermined DC potential of opposite polarity;

third means coupled to said first and second means for providing a control signal having a polarity responsive to the difference between said DC reference potential and said varying output signal;

switching means coupled to said first and third means for reversing the polarity of said DC reference potential upon the occurrence of a change in polarity in said control signal;

motor speed circuit means for controlling the speed of said drive motor;

fourth means coupled to said first and third means for providing a speed adjustment signal in each stroke at a predetermined instant proportional to when said control signal equals said DC potential; and

deceleration control means responsive to the occurrence of said speed adjustment signal for decreasing the current in said motor speed circuit means at a predetermined rate until substantially zero current flows in said circuit.

4,034,185

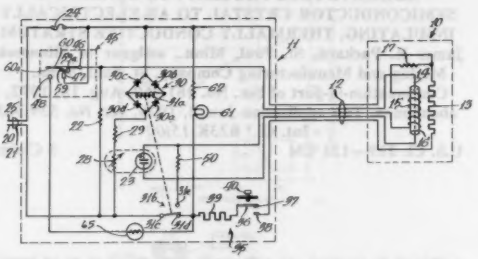
ELECTRIC BLANKET CONTROL CIRCUIT

George C. Crowley, Winnetka, Ill., assignor to Northern Electric Company, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,243
Int. Cl.² H02H 1/02; H05B 3/34
U.S. Cl. 219—212 15 Claims

1. An overheat protection circuit for an electric blanket having a heating means and a sensing means to detect an overheat condition comprising switch means to electrically activate said heating means; said switch means having at least two mechanically stable positions; circuit means to electrically simulate an overheat condition; and said simulating circuit means activated each time said switch means is switched to one of its said stable positions.

12. An overheat protection circuit for an electric blanket having a heat means and a sensing means to detect an overheat condition comprising deactivation circuit means electrically connected to said sensing means and including switch means to deactivate said heating means when an overheat condition is detected; a fuse separate from said sensing means



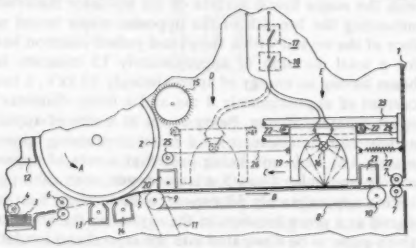
connected in circuit with said heating means; and testing means connecting said switch means and said fuse in series across the input voltage source whereby said fuse will break down if said switch means has malfunctioned to test for a malfunction in said deactivation circuit means.

4,034,186

METHOD AND ARRANGEMENT FOR PREVENTING SHEETS FROM CHARRING IN COPYING MACHINES

Friedrich Bestenreiner, Grunwald, and Dieter Gigiberger, Unterhaching, both of Germany, assignors to AGFA-Gevaert, Aktiengesellschaft, Leverkusen, Germany

Filed Mar. 10, 1976, Ser. No. 665,382
Claims priority, application Germany, Mar. 15, 1975, 2511424
Int. Cl.² H05B 1/00; G03G 15/20
U.S. Cl. 219—216 12 Claims



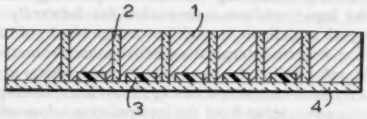
1. In an electro-photographic copier of the type wherein an image is formed on an image-carrying sheet and is thereafter fixed by subjecting the sheet at a fixing station to the influence of heat, a combination comprising heating means at said station for fixing an image on a sheet; and means for moving said heating means relative to a sheet located in said station at a predetermined speed sufficient to permit said heating means to fix the image on the sheet and also to prevent charring of the latter.

4,034,187

THERMAL PRINTING HEAD

Tatsuyuki Tomioka, Hirakata; Noboru Yukami, Kawanishi; Yoshi Hamaguchi, and Kiyoharu Yamashita, both of Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Sept. 15, 1975, Ser. No. 613,463
Claims priority, application Japan, Sept. 18, 1974, 49-108240; Oct. 17, 1974, 49-120131
Int. Cl.² H05B 1/00
U.S. Cl. 219—216 1 Claim



1. A thermal printing head of the silicon planar type which comprises a silicon substrate having a generally flat substantially unbroken surface for being brought into contact with a thermosensitive paper;

a plurality of heat-generating layer elements which are provided in the silicon substrate, each heat-generating layer having an electrical resistivity;

heat-insulation portions of silicon dioxide extending through the thickness of the substrate around each heat-generating layer element whereby the domains surrounded by the heat-insulation portions constitute heat-generating elements, the heat-insulation portions preventing heat which is generated from the heat-generating elements; and

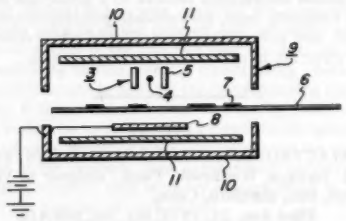
a plurality of electrodes connected to the heat-generating elements for energizing them.

4,034,188

HEAT FIXING DEVICE FOR COPYING MACHINE

Koichi Takiguchi, Ebina, Japan, assignor to Rank Xerox, Ltd., London, England

Filed May 24, 1976, Ser. No. 689,294
Claims priority, application Japan, July 31, 1975, 50-092561
Int. Cl.² H01B 1/00; C03G 15/20
U.S. Cl. 219—216 3 Claims



1. Fuser apparatus for fixing toner images to support body, said apparatus comprising:

a source of thermal energy for causing the toner forming said images to coalesce and become tacky; and

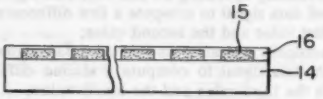
means interposed between said source of thermal energy and said support body for improving the efficiency of heat transfer from said thermal energy source to said toner, said means for improving a heat transfer efficiency comprising: a corona discharge device.

4,034,189

DEVICE FOR HEAT FIXATION

Hisashi Sakamaki, Yokohama, and Toshiyuki Ohtani, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 30, 1975, Ser. No. 582,296
Claims priority, application Japan, June 4, 1974, 49-63217
Int. Cl.² H05B 1/00
U.S. Cl. 219—216 4 Claims



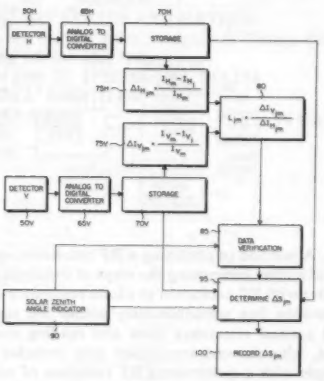
1. In a heat fixing device for fixing an electrophotographic image developed with a developer containing a toner composition onto a copy material comprising a heating member having a heat resistant insulating support and a heat generating member on said support, the improvement for protecting the heat generating member, preventing the buildup of developer and minimizing friction and abrasion between the heat fixing device and the copy material comprising a heat resistant, thin film coating having a film thickness up to about 30 microns for said heating member overlying said heat generating member.

4,034,190

METHOD AND APPARATUS FOR REMOTE SALINITY SENSING

Peter G. White, Palos Verdes Peninsula, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Mar. 15, 1974, Ser. No. 451,391
Int. Cl.² G01V 1/28
U.S. Cl. 235—151.3 21 Claims



1. In a method of remotely determining the degree of salinity of water at a specified point at the surface of a body thereof, the steps of:

a. electro-optically generating a first data signal representative of a first value, corresponding to the intensity of at least a finite wavelength band of the horizontally-polarized component of sunlight specularly reflected from a solar glitter pattern at the specified point;

b. electro-optically generating a second data signal representative of a second value, corresponding to the intensity of at least a finite wavelength band of the horizontally-polarized component of sunlight specularly reflected from the solar glitter pattern at another point;

c. electro-optically generating a third data signal represen-

tative of a third value, corresponding to the intensity of at least a finite wavelength band of the vertically polarized component of sunlight specularly reflected from the solar glitter pattern at the specified point;

d. electro-optically generating a fourth data signal representative of a fourth value, corresponding to the intensity of at least a finite wavelength band of the vertically polarized component of sunlight specularly reflected from the solar glitter pattern at the other point;

e. electronically operating on said first data signal and said second data signal to compute a first difference between the first value and the second value;

f. electronically operating on said third data signal and said fourth data signal to compute a second difference between the third value and the fourth value;

g. electronically computing a first ratio of said first difference to said first value;

h. electronically computing a second ratio of said second difference to said third value; and

i. electronically computing an empirical reference factor, defined as the ratio of said second ratio to said first ratio.

4,034,191

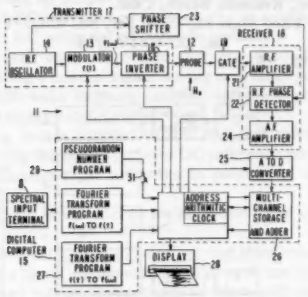
SPECTROMETER MEANS EMPLOYING LINEAR SYNTHESIZED RF EXCITATION

Barrett L. Tomlinson, Palo Alto, and Howard D. W. Hill, Cupertino, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 494,802, Aug. 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 350,457, April 12, 1973, abandoned. This application June 19, 1975, Ser. No. 588,264

Int. Cl.[2] G01N *27/78*; G01R *33/08*

U.S. Cl. 235—151.3 **26 Claims**



1. A method of obtaining a RF resonance spectra of a sample of matter comprising the steps of irradiating said sample of matter with RF excitation to excite resonance of a spectrum of resonance line simultaneously within the sample, detecting said excited resonance lines and reading out said detected lines, wherein said irradiation step includes irradiating the sample with a spectrum of RF radiation of nonuniform spectral power density in or near the frequency region of the resonance line spectrum to be excited.

4,034,192

NUMERICAL CONTROL SYSTEM HAVING A SYMMETRICAL PATH GENERATION MEANS

Hajimu Kishi, and Fumio Onoda, both of Tokyo, Japan, assignors to Oki Electric Industry Company, Ltd., Tokyo, Japan

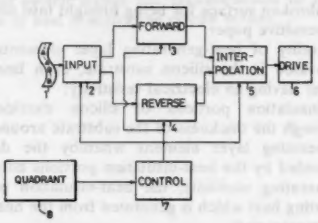
Filed Dec. 5, 1975, Ser. No. 637,971

Claims priority, application Japan, Dec. 13, 1974, 49-142472

Int. Cl.[2] G05B *19/24*

U.S. Cl. 235—151.11 **3 Claims**

1. A system generating symmetrical paths for numerical control, characterized in that the system comprises (1) an input medium for numerical control, said input medium carrying positional information convertible into increments in a device, and instruction information, said instruction information including sets of instruction blocks, each set of instruction blocks being adapted to continue the function of one instruction until another instruction interrupts the function of said one instruction, said instruction information being so edited as to apply one instruction to the first block and the last block of that set of instruction blocks, which set is to continue the function of said one instruction; (2) an input means reading the input medium both in the forward and reverse directions; (3) a circuit producing forward-interpolating-information from the input medium information for forwardly moving along a path as defined by each instruction block; (4) a circuit producing reverse-interpolating-information from the input medium information for reversely moving along a path as defined by each instruction block; (5) an interpolating circuit producing pulse series from the interpolating information; (6) a circuit driving various shafts of a machine tool in response to the pulse series; and (7) a symmetrical path control circuit



which controls whether the input means reads the input medium forwardly or reversely, which one of the forward-interpolating-information producing circuit and the reverse-interpolating-information producing circuit should operate, and whether the interpolating circuit reverses the moving direction in each axis or not; whereby, in case of generating the path as defined by the input medium information, the input medium is read forwardly, forward-interpolating-information is produced, and the pulse series are produced without changing the moving direction in any axis; in case of generating a path which is axially symmetrical with the path as defined by the input medium information relative to a line parallel to one axis of coordinates, the input medium is reversely read, reverse-interpolating-information is produced, and the pulse series are produced while reversing the moving direction in the other axis of the coordinates; and in case of generating a path which is symmetrical with the path as defined by the input medium information relative to a point, the input medium is forwardly read, forward-interpolating-information is produced, and pulse series are produced while reversing the moving direction in each axis of the coordinates.

4,034,193

ELECTRONIC ACCESS CONTROL SYSTEM

James J. Jackson, Westbrook, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

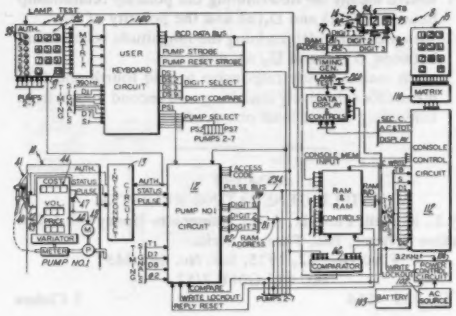
Filed Aug. 21, 1975, Ser. No. 606,416

Int. Cl.[2] G06F *15/24*; B67D *5/14*

U.S. Cl. 235—151.34 **32 Claims**

1. A multiple station access control and accounting system for activation and use, by a plurality of authorized users, of a plurality of separate operating stations, each adapted to be activated for predetermined use thereof and having means for generating a train of a plurality of pulses in accordance with the amount of use thereof; the users having different assigned multiple digit identifiers, each having a multiple digit memory block address code portion and a multiple digit security code portion, for activating the operating stations for use thereof;

the access control and accounting system comprising read/write memory means having an assigned multiple digit memory block for each user, corresponding to the user's assigned memory block address code, with a first multiple digit security code section for having written therein the user's assigned multiple digit security code and a second multiple digit accumulator section for accumulating a multiple digit count of the user's operating station usage; read/write memory control means selectively operable for selecting each user memory block and selectively operable for selectively reading the accumulated count of the accumulator section of the selected user memory block, for selectively incrementing the accumulated count of the selected user memory block, and for selectively writing an assigned multiple digit security code in the security code section of the selected user memory block; operating station control means for each operating station having a settable user memory block selector for operating the read/write memory control means for selecting a user memory block of the read/write memory means; controller entry means having a readout register and operable by a controller for operating the read/write memory control means for selecting each user memory block and selectively operable for



operating the read/write memory control means for writing a selected multiple digit security code in the multiple digit security code section of the selected user memory block and for reading the accumulated count of the selected user memory block with the readout register; user entry means operable by each user to select an operating station and enter the user's multiple digit identifier into the access control and accounting system to set the user memory block selector of the selected operating station control means with the multiple digit memory block address code portion thereof for selecting the corresponding user memory block of the read/write memory means; and comparator means operable for comparing the security code portion of the entered user identifier with the security code stored in the selected user memory block; the selected operating station control means being operable by the comparator means to activate the corresponding operating station only if the stored and entered security codes are the same; the read/write memory control means being operable by the pulses of each operating station to increment the accumulated count in the multiple digit accumulator section of the corresponding selected user memory storage block in accordance with the number of such pulses.

4,034,194

METHOD AND APPARATUS FOR TESTING DATA PROCESSING MACHINES

David E. Thomas; Marion B. McCoy, and Michael J. Chaky, all of Seaford, Del., assignors to NCR Corporation, Dayton, Ohio

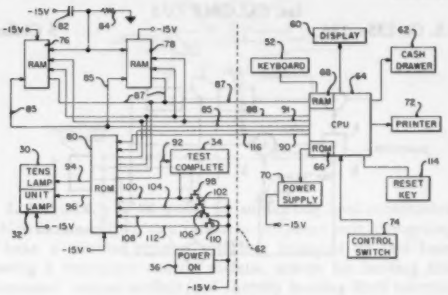
Filed Feb. 13, 1976, Ser. No. 658,135
Int. Cl.² G06F *11/04*
U.S. Cl. 235—153 AC **6 Claims**

1. A method of utilizing a test apparatus with a data processing apparatus having stored data therein, said data processing apparatus including means for recording on a record member the data stored in the apparatus, the method comprising the steps of:

a. generating a first record of the data stored in the data processing apparatus;

b. transferring the stored data from the data processing apparatus to the test apparatus;

c. conditioning the data processing apparatus for operation in a test mode;



d. transferring the stored data from the test apparatus to the data processing apparatus;

e. generating a second record of the data stored in the data processing apparatus;

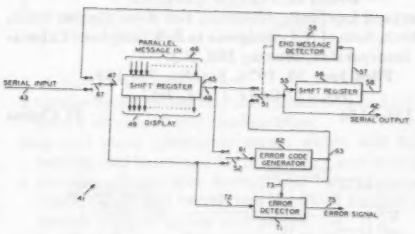
f. and comparing the data on the said first and second records.

4,034,195

TEST APPARATUS AND METHOD

Danny E. Bates, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 22, 1975, Ser. No. 543,174
Int. Cl.² G06F *11/00*; G08C *25/00*
U.S. Cl. 235—153 AC **16 Claims**



1. Apparatus comprising:

a test input means for receiving serial binary data;

a test output means for transmitting serial binary data;

means for establishing a preselected binary test message representative of a computer command;

means for serially transmitting said test message from said test output means;

means for generating a first error code in response to transmission of said test message;

means for transmitting said first error code from said test output means;

means for receiving and storing a serial binary message response received by said test input means; and

means for displaying said message response.

4,034,196
DIGITAL SIGNAL PROCESSING DEVICE WITH QUANTIZER

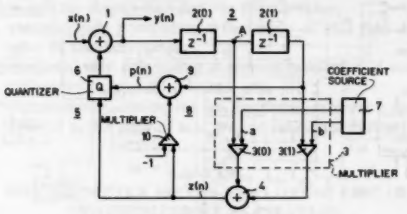
Hans-Jurgen Butterweck, Akert; Theodoor Antonius Carel Maria Claasen, Eindhoven; Wolfgang Friedrich Georg Mecklenbrauker, Eindhoven, and Johannes Bernhard Heinrich Peek, Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 23, 1975, Ser. No. 625,183

Claims priority, application Netherlands, Nov. 14, 1974, 7414848

Int. Cl.² G06F 7/38

U.S. Cl. 235—156 **5 Claims**



1. A digital signal processing device comprising:

supply means for supplying a sequence of code word signals;

coefficient storage means for storing predetermined weighting coefficients;

multiplying means for multiplying ones of said code word signals by ones of said weighting coefficients and producing a sequence of output signals; and

first combination means for combining two sequences of signals from said multiplying means, and producing an output signal;

feedback means for feeding back a quantized representation of said output signals to said supply means, comprising a quantizer having a first and second input, and an output connected to said supply means, and

second combination means for combining said output signal of said digital multiplier with a sequence of code word signals from said supply means, and producing an output signal for controlling said quantizer.

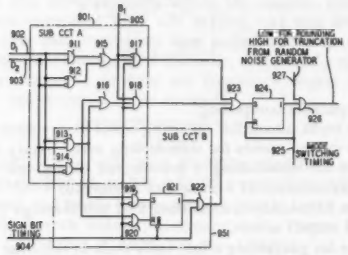
4,034,197
DIGITAL FILTER CIRCUIT

Victor Bernard Lawrence, Matawan, and Kent Vincent Mina, Colts Neck, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 30, 1976, Ser. No. 701,195

Int. Cl.² G06F 15/34, 7/52

U.S. Cl. 235—156 **29 Claims**


SUB CCT A
SUB CCT B
LOW TOK ROUNDING HIGH FOR TRUNCATION FROM RANDOM NOISE GENERATOR
MODE SWITCHING TIMING
SIGN BIT TIMING

1. In a recursive digital filter including:

a. a forward path including an input terminal for receiving an input signal X(n) and an output terminal for supplying an output signal Y(n);

b. a first feedback loop including a first delay element and a first digital multiplier circuit, said first feedback loop being arranged to form a first signal given by the product $-B_1D_1(n)$, wherein

$-B_1$ = the multiplier coefficient of said first digital multiplier circuit,

$D_1(n) = Y(n-1)$,

n = the time at which a variable is sampled,

c. a second feedback loop including a second delay element and a second digital multiplier circuit, said first and second feedback loops together being arranged to form a second signal given by the product $-B_2D_2(n)$, wherein

$-B_2$ = the multiplier coefficient of said second digital multiplier circuit, and

$D_2(n) = Y(n-2) = D_1(n-1)$,

d. first means for summing said first and second signals and said input signal to form said output signal, said output signal being given by

$Y(n) = X(n) - B_1D_1(n) - B_2D_2(n)$, and

e. second means for randomly switching between rounding and truncating of at least one of said products, the improvement comprising:

f. third means operable to control said random switching means, said third means including

1. fourth means for determining the polarity relationship between $D_1(n)$ and $D_2(n)$ and the polarity of B_1,

2. fifth means for determining the magnitude relationship between $D_1(n)$ and $D_2(n)$, and

3. sixth means jointly responsive to said fourth and fifth means for selectively inhibiting said second means from truncating said at least one product.

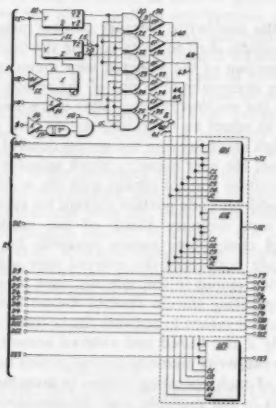
4,034,198
MULTIPLE GENERATING REGISTER

Jerry L. Kindell, Phoenix, Ariz., assignor to Honeywell Information Systems, Inc., Phoenix, Ariz.

Filed Dec. 22, 1975, Ser. No. 642,845

Int. Cl.² G06F 7/52

U.S. Cl. 235—164 **5 Claims**



1. A multiple-generating register for generating multiples of a first binary number which is input thereto, said register comprising:

a control circuit responsive to a first control signal for generating a second control signal, said second control signal representing one of a plurality of possible multiple-generating commands; and

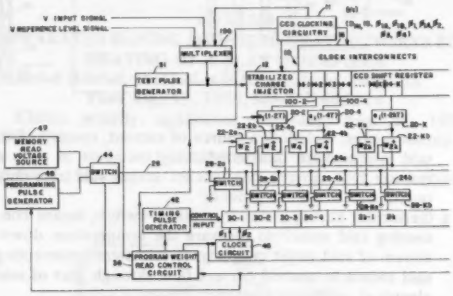
a plurality of logic circuits, one for each bit of said first binary number, each receiving as a first input a respective bit of sid first binary number and receiving as a second input the next lowest order bit of said first binary number, except that said logic circuit which receives as a first input the lowest order bit of said first binary number

receives as a second input a zero-valued binary bit, said plurality of logic circuits generating a second binary number which is a multiple of said first binary number in response to said second control signal.

4,034,199
PROGRAMMABLE ANALOG TRANSVERSAL FILTER

Donald R. Lampe, Ellicott City; Marvin H. White, Laurel, and James H. Mims, Linthicum Heights, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 507,115, Sept. 17, 1974, abandoned. This application Dec. 8, 1975, Ser. No. 638,569
Int. Cl.² G11C *11/40*; H03K *5/159*
U.S. Cl. 235—193 **17 Claims**



5. A discrete analog signal processing system for processing an input signal in accordance with a pattern of weighting factors, said system comprising:

a. a matrix of memory elements disposed in rows and columns, each of said memory elements comprises an MNOS field effect transistor and capable of storing an analog weighting factor of the pattern and responsive to a portion of the input signal applied thereto for providing an element output indicative of the product of the stored weighting factor and the input signal portion, said matrix further comprising first sets of row and column conductors coupled to the corresponding memory elements of said matrix and means for isolating one row of said memory elements from the remaining rows thereof;

b. first converter means comprising a plurality of stages, each coupled to corresponding column conductors and responsive to the input signal for disposing sequentially a portion of the input signal at each of its stages, whereby a signal portion is applied through its corresponding column conductor to those memory elements of that column;

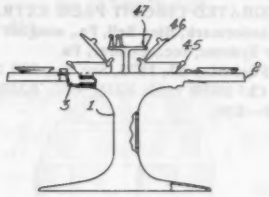
c. second converter means comprising a plurality of stages, each coupled to a row conductor of said matrix, for summing and storing the element outputs of those memory elements of that row and operative to sequentially read out the plurality of summed row signals; and

d. means for programming the pattern of weighting factors onto corresponding ones of said memory elements, said programming means including first generator means for applying programming signals to each of said row regions, a second set of column conductors coupled to the gate electrodes of said memory element of that column, and second generator means for applying programming signals to each of said column conductors of said second set.

4,034,200
ARTICLE OF FURNITURE

Gerhardus Johannes Cornelius Visagie, 9 Amatola Road, Verwoerdburg, South Africa

Filed Dec. 11, 1975, Ser. No. 639,976
Claims priority, application South Africa, Apr. 6, 1975, 75/3601; Dec. 12, 1974, 74/7931
Int. Cl.² H05B *1/00*
U.S. Cl. 219—218 **11 Claims**

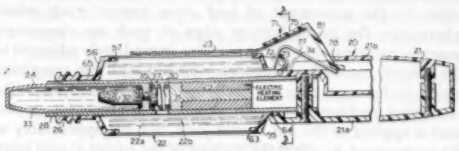


1. A rotatable heating unit for supporting food receptacles, which is convertible to a rotatable unheated unit, comprising a base, a circular support rotatably mounted on said base, having a depressed central surface, means for heating said depressed central surface and thereby heating food receptacles supported thereon, a removable cover which substantially fills the depressed central portion of said support and comprises a substantially level unheated surface for supporting food receptacles, and means for spacing said cover from said depressed central surface.

4,034,201
STEAM CURLING IRON HAVING INTERCHANGEABLE HAIR WINDING MANDRELS

Henry J. Walter, Wilton, and Raymond W. Kunz, Monroe, both of Conn., assignors to Clairol Incorporated, New York, N.Y.

Filed Apr. 28, 1975, Ser. No. 572,098
Int. Cl.² H05B *1/00*; A45D *1/04*, *2/36*
U.S. Cl. 219—222 **24 Claims**



1. A hair device comprising:

a tubular barrel having first and second ends and a predetermined cross-sectional configuration;

heat and vapor generating means within said barrel for heating said barrel and for producing vapor in said barrel;

a plurality of apertures through said barrel for conveying vapor out of said barrel, said apertures being located in spaced relation around said barrel;

a handle portion extending from the first end of the tubular barrel;

a mandrel for winding hair therearound, said mandrel cross sectional area exceeding that of the tubular barrel, wherein said mandrel is removably received over the barrel for replacement by a simularly constructed mandrel having a different hair engaging surface, and wherein said mandrel is generally tubular in configuration about a longitudinal axis, has first and second ends and inner and outer surfaces;

a plurality of passages through the mandrel; and

a plurality of resilient fins arranged in pairs to form ducts therebetween which register with the passages in the mandrel, wherein the fins extend from the inner surface of the mandrel toward the barrel and engage the barrel to

hold the mandrel in spaced relation with the barrel, and wherein the fins engage the barrel adjacent the apertures of the barrel with the apertures aligned with the ducts so that the vapor in the barrel passes through the ducts and through the passages in the mandrel while the heat is conducted by the fins to the mandrel, whereby hair wound around the outer surface of mandrel is treated with heat and vapor

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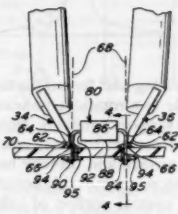
4,034,202

INTEGRATED CIRCUIT PACK EXTRACTOR

Harold F. Vandermark, Blue Bell, Pa., assignor to Nu-Concept Computer Systems, Inc., Colmar, Pa.

Filed May 23, 1975, Ser. No. 580,260
Int. Cl.² H05B *1/00;* **B23K** *3/00;* **B25B** *27/14*
U.S. Cl. 219—230 **8 Claims**



1. A tool for extracting electrical components having at least one pin from printed circuit boards to which said pin is soldered, comprising: a pair of tongs including first and second elongated arms, each arm being movable with respect to each other and including an electrically heated tip portion mounted thereon, each tip portion including a generally planar inside face extending at at least a half degree angle to a plane bisecting the space between said faces, each face terminating at a continuous linear bottom edge extending at an acute angle to the longitudinal axis of the arm upon which said tip is mounted so that when said tip is in contact with said pin, said arm extends at an acute angle to said board to provide visibility of said pack, said tips being arranged to be moved toward each other by the movement of said arms toward each other, whereupon the linear bottom edge of each tip clampingly engages and abuts said pin at portions immediately adjacent to the printed circuit board solder joint but with the remaining inside surface portions of each tip being remote from the remaining portions of the pin above the solder joint so that heat is applied to the pin at said joint, but not appreciably to the component, to effect the melting of the solder at said joint, said bottom edges clampingly engaging the pin therebetween, whereupon when said solder is melted the pack can be readily removed from said board by the movement of said tool away from said board.

4,034,203

ELECTRICALLY HEATED STEAM GENERATOR

Jerry D. Cooper, 1210 N. Texas, Odessa, Tex. 79761

Filed Aug. 19, 1974, Ser. No. 498,748
Int. Cl.³ H05B *1/02;* **F22B** *1/28;* **B05B** *1/24;* **F24H** *1/10*
U.S. Cl. 219—272 **5 Claims**

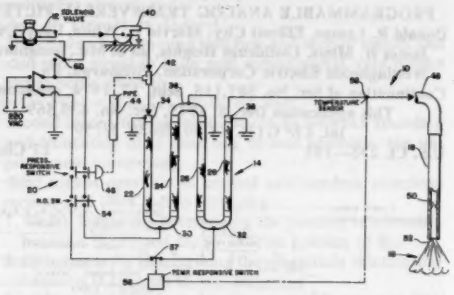
1. An electrical heating apparatus comprising:

an elongated non-conducting tubular element made of resilient, flexible, polymer reinforced fabric ply; said tubular element having a longitudinally extending axial passageway formed therethrough, through which liquid can flow; opposite ends of said tubular element being defined by an electrical conducting fluid inlet coupling and an electrical conducting fluid outlet coupling;

a source of water, means connecting said inlet coupling to said source of water, an elongated, flexible electrical resistance element located within and coextensively arranged respective to said axial passageway;

means electrically connecting the opposite free ends of said electrical resistance element, respectively, to said inlet and outlet coupling, respectively; means by which said inlet and outlet couplings are electrically grounded;

A plurality of electrical conducting intermediate fluid conducting members connected to intermediate portions of said tubular element; said electrical resistance element having intermediate portions; means by which said intermediate portions of said electrical resistance element are electrically connected to said intermediate fluid conducting members;



circuit means, including a source of current, connected to said intermediate fluid conducting members in such a manner that current flow occurs across said electrical resistance element to ground;

a thermostat having a sensor actuated switch, means connecting said sensor to measure the temperature downstream of said outlet coupling, circuit means connecting said switch to control current flow through part of said electrical resistance element;

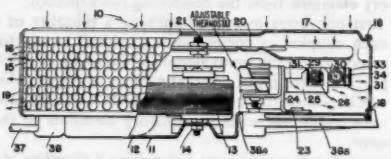
so that liquid flowing through said tubular element is heated by said resistance element, thereby elevating the temperature of the liquid as it flows from said inlet coupling to said outlet coupling.

4,034,204

ELECTRIC HEATER FOR WARMING THE INTERIOR OF A CAR

Lynne E. Windsor, and Lawrence Smorang, both of Winnipeg, Canada, assignors to James B. Carter Limited, Winnipeg, Canada

Filed June 13, 1975, Ser. No. 586,564
Claims priority, application Canada, June 28, 1974, 203699
Int. Cl.² H05B *1/00;* **F24H** *3/04;* **B60H** *1/02*
U.S. Cl. 219—368 **8 Claims**



1. A heater for the interior of cars, trucks and the like adapted to be operated from a source of electrical power; comprising in combination a substantially cylindrical casing which includes a base plate, an air intake end plate, and an air discharge circumferential wall between said base plate and said air intake end plate, thus maintaining the same in substantially spaced and parallel relationship one with the other, a fan motor centrally mounted within said casing and upon said base plate and connectable to said source of electrical power, a fan driven by said motor in a plane substantially parallel to said base plate, said fan being situated above said motor and

adjacent said air intake end plate, a heating element within said casing also connectable to said source of electrical power, said heating element being formed in a single length counterangulated between the ends thereof to form outer and inner portions, said portions being arcuately curved and having a degree of curvature similar to the degree of curvature of said perimetrical wall but lying spaced inwardly therefrom, said inner and outer portions lying substantially spaced and parallel one from the other, means to support said heating element within said casing, said means comprising a combination air deflector and support bracket secured to said base plate, said bracket being formed from a shaped flat plate extending upwardly from said base plate and being situated between part of said heater element and said fan motor, the upper edge of said bracket terminating just below said fan, said bracket extending around approximately 180° of said cylindrical casing, lugs extending radially outwardly from said bracket, the inner and outer portions of said heating element being supported by said lugs intermediate said base plate and said air intake end plate, and a guard strip between said heating element and said circumferential wall.

4,034,205

APPARATUS HAVING MULTIPLE HEATING WIRES FOR HEATING OF A FLAT WORKPIECE

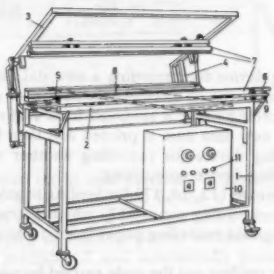
Wilfried Reichel, Muhle 1, 6501 Bubenheim, Germany

Filed Aug. 19, 1975, Ser. No. 605,916

Claims priority, application Germany, Aug. 28, 1974, 2441181

Int. Cl.² F27D *11/02*

U.S. Cl. 219—385 **7 Claims**



1. An apparatus for local rectilineal heating of a flat workpiece of thermoplastic material, so that the workpiece can be bent when it is heated, comprising a first frame-shaped support, a second frame-shaped support pivotally displaceably between a first position disposed opposite, parallel and adjacent to said first support and a second position swung upwardly from the first position away from said first support, a first pair of longitudinally extending bar displaceably mounted on said first support, a second pair of longitudinally extending bars displaceably mounted on said second support, said first pair of bars spaced from and aligned opposite said second pair of bars in the first position of said second support and forming a first space therebetween for gripping the workpiece between said first pair and said second pair of bars, the bars in each said pair spaced laterally apart to form a second space therebetween facing toward and open to the first space between said first and second pair of bars, at least one heating wire forming a heat source and positioned in the second space between at least one of said pairs of first and second bars for effecting contactless heating of the workpiece gripped in the first space, and means for variably spacing said heating wire within the second space with respect to the first space for varying the distance between said heating wire and the workpiece, the lateral spacing between the bars in the at least one of the said pairs of bars with said heating wire therebetween is variable for varying the spacing between said bars and said heating wire in accordance with the thickness and the bending requirements of the workpiece to be bent.

4,034,206

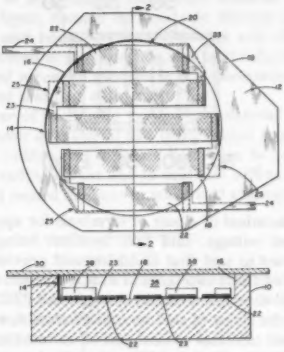
RANGE TOP ELEMENT

Glen H. Penrod, North Olmsted, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Filed May 11, 1976, Ser. No. 685,331

Int. Cl.² H05B *3/68*

U.S. Cl. 219—464 **10 Claims**



1. A heating element assembly comprising a thermally conducting electrically insulating rigid ceramic sheet;

a block of thermally and electrically insulating material, a face of said block having a wall projecting therefrom to define a recess in said block, said block being positioned against said ceramic sheet such that said recess and said sheet define a chamber;

and a planar heating element of apertured foil-like electrical resistance material, said element being contained in said chamber and being spaced from and in noncontiguous relationship with said ceramic sheet, the periphery of said element defining a plane parallel to said ceramic sheet, said wall containing a plurality of cavities, said cavities each containing a peripheral portion of said element, said planar heating element of apertured foil-like electrical resistance material being in the form of an array of thin flat strips, said strips being equidistantly spaced from each other and electrically connected to each other.

4,034,207

POSITIVE TEMPERATURE COEFFICIENT SEMICONDUCTOR HEATING ELEMENT

Minoru Tamada; Takashi Shikama, and Toshikazu Nakamura, all of Yokaichi, Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

Filed Apr. 30, 1976, Ser. No. 682,161

Claims priority, application Japan, Jan. 23, 1976, 51-7123[U]; Jan. 23, 1976, 51-7124[U]; Jan. 29, 1976, 51-14640[U]; Jan. 29, 1976, 51-14642[U]; Jan. 29, 1976, 51-14645[U]; Jan. 29, 1976, 51-14647[U]

Int. Cl.³ H05B *1/02*

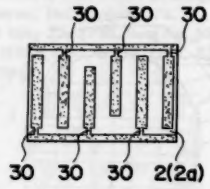
U.S. Cl. 219—517 **12 Claims**

1. A positive temperature coefficient semiconductor (PTCS) heating element comprising:

a. a PTCS body having two opposite flat and mutually parallel faces;

b. a first electrode having a plurality of strips of metal film electrically connected to each other at its one end and being separated from each other along their respective length with at least one of said strips being shorter than other strips and said first electrode being provided on an upper face of said two faces of said PTCS body;

c. a second electrode having a plurality of strips of metal film electrically connected to each other at its one end and being separated from each other along their respective length with at least one of said strips being shorter than other strips and said second electrode being provided on said upper face in such a manner that the strips of opposite electrodes are alternately disposed on said upper face so that neighboring strips of respective strips are members of opposite electrode;



d. a first terminal of a pair of terminals for applying predetermined voltage, said first terminal being electrically connected to said first electrode and provided on a bottom face of said two faces at such a position that said first terminal does not overlap, through the PTCS body, with any of the strips of said second electrode; and

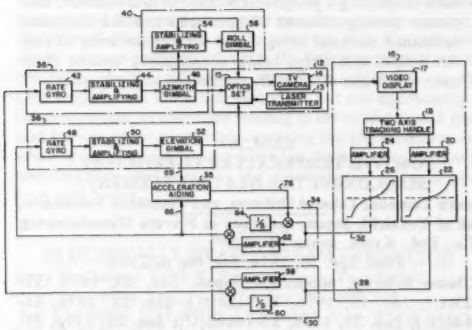
e. a second terminal of said pair of terminals, said second terminal electrically connected to said second electrode and provided on said bottom face at such a position that said second terminal does not overlap, through the PTCS body, with any of the strips of said first electrode.

4,034,208

ACCELERATION AIDED TRACKING OF A DESIGNATED TARGET

James E. Vaeth, Baltimore, and Brewton O. Van Hook, Ellicott City, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 25, 1976, Ser. No. 661,073
Int. Cl.² G06G 7/80; H04N 5/14
U.S. Cl. 235—61.5 S **10 Claims**



1. A system for tracking an object with respect to the position of a gimbaled sensor that is controlled in response to an azimuth angular rate command signal and in response to an elevation angular rate command signal said system comprising:

a tracking control means to generate azimuth and elevation error signals;

an azimuth control for generating the azimuth angular rate command signal to control the gimbaled sensor in response to the generated azimuth error signal;

an elevation control for generating the elevation angular rate command signal to control the gimbaled sensor in response to the generated elevation error signal and in response to an elevation angular acceleration aiding signal; and

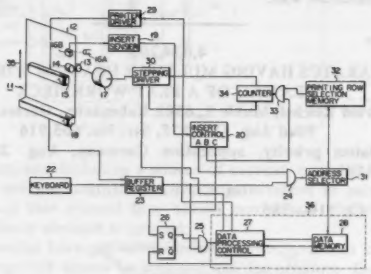
means for generating the elevation angular acceleration aiding signal in response to the generated elevation angular rate command signal and in response to the elevation deflection angle of said gimbaled sensor to provide acceleration aiding for the elevation control.

4,034,209

RECORDING DEVICE

Toshio Kashio, Yamato, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 311,549, Dec. 4, 1972, abandoned. This application July 12, 1974, Ser. No. 488,027
Claims priority, application Japan, Dec. 8, 1971, 46-99217
Int. Cl.² G06K 1/18, 7/10; G01D 9/04
U.S. Cl. 235—61.9 R **6 Claims**



1. A recording device for recording a new data item on a recording paper adjacent an already printed row of data, and wherein said recording paper is removed from said recording device after said new data item is printed and then fed again into said recording device for recording another new data item, said recording device comprising:

paper driving means (13, 14, 17) for feeding to said recording device a recording paper (12) which carries a code distinguishing said recording paper from other recording papers;

means (18) for reading out the code carried by said recording paper (12);

storage means (28) having a plurality of addresses, each being assigned to an individual recording paper, for storing first data in, and reading data out from an address designated by said read out code, said first data corresponding to the data items already printed on said recording paper and the information indicating the printed row of said recording paper;

address designating means (31) coupled to said storage means (28) and to said read out means (18) for designating an address of said storage means (28) corresponding to said read out code;

means (32) coupled to said address designating means (31) for reading out from the address designated by said address designating means (31) said information indicating the printed row, so that the printed row can be read out when the recording paper is fed again into the recording device;

control means (30, 33, 34) coupled to said paper driving means (13, 14, 17) for controlling said paper driving means (13, 14, 17) in accordance with said information read out from said storage means (28) so as to set said recording paper (12) at a new printing position corresponding to a row in which said new data item is to be printed;

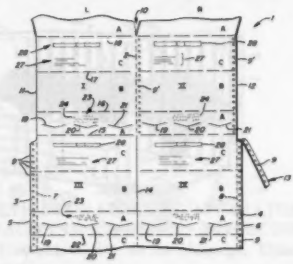
said storage means including means for reading out said first data from the address designated by said address designating means (31);

data input means (22, 23) for supplying input data items;
arithmetic operation means (27) coupled to said storage means and to said data input means for receiving an input data item and for obtaining second data which is the sum of said first data read out from said storage means (28) and an input data item;
means (29) coupled to said arithmetic operation means (27) for printing said second data obtained by said arithmetic operation means at said new printing position on said recording paper; and
means (27) for writing in the designated address of said storage means (28) said second data and the information indicating the row in which the second data is printed.

4,034,210
CREDIT CARD CARRIERS AND METHODS OF MANUFACTURE

James E. Hill, Prospect Heights; Baesley I. Dahlstrom, Des Plaines, and Robert D. Fisher, Melrose Park, all of Ill., assignors to Dynetics Engineering Corporation, Wheeling, Ill.

Filed Sept. 19, 1975, Ser. No. 615,112
Int. Cl.² G06K 19/00; B65B 5/10
U.S. Cl. 235—61.12 N 65 Claims

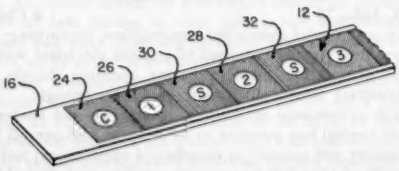


1. Improved credit card carriers comprising:
a. a web of sheet material having a pair of substantially parallel side edges, a top edge and a bottom edge;
b. a plurality of foldable panels defined by fold lines disposed medially of, and substantially parallel to, said top and said bottom edges;
c. a plurality of means for receivingly engaging credit cards disposed in at least one of said panels;
d. said panels being adapted to wedge trap said cards when folded with said cards disposed between said panels.

4,034,211
SYSTEM AND METHOD FOR PROVIDING A SECURITY CHECK ON A CREDIT CARD

William R. Horst, Dayton, and William J. Hale, Kettering, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed June 20, 1975, Ser. No. 588,937
Int. Cl.² G06K 19/06, 7/14; G02B 5/18; G06K 19/08
U.S. Cl. 235—61.12 N 12 Claims

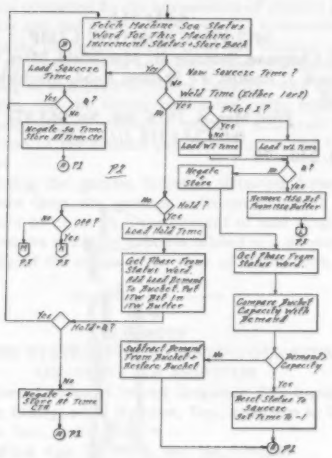


1. A security system comprising:
a record medium having first data thereon in a first form and second data thereon in a second form;
first and second reading means for reading said first data and said second data respectively from said record medium;
said first data being in the form of diffraction gratings; an comparison means for comparing selected portions of said first data read with selected portions of said second data read and for producing a signal which is indicative of the validity of said record medium;
said record medium comprising:
a generally planar body portion;
a first layer of deformable transparent material having a reflective layer, formed on one side thereof and positioned on said body portion and having said diffraction gratings formed in said one side with said reflective layer thereon and arranged thereon in a predetermined order to represent said first data; and
a second layer of protective transparent material covering said first layer of material and being sealed to said body portion to enable said diffraction gratings to be read by said first reading means and to seal said diffraction gratings in said record medium to make said gratings tamperproof.

4,034,212
WELDING AND AUTOMATION CONTROL SYSTEM

Charles F. Paxton, Farmington, Mich., assignor to Weltronic Company, Southfield, Mich.

Continuation of Ser. No. 368,062, June 8, 1973, abandoned.
This application Feb. 28, 1975, Ser. No. 553,918
Int. Cl.² B23K 9/12
U.S. Cl. 235—151.1 8 Claims



1. A welding control system for controlling the various portions of a welding cycle including the weld portion of the cycle, comprising a power supply, a plurality of welding heads connected to said power supply, and a general purpose computer programmed to control the welding cycle for all of said plurality of welding heads and to control the application of welding power from said power supply to said plurality of welding heads; said computer being programmed to postpone the application of welding power to one or more of said plurality of welding heads whenever the welding power demand of said one or more welding heads combined with the total amount of power currently being supplied to other welding heads in the weld portion of the welding cycle will exceed a preselected power level, until such time as said welding power demand can be supplied to said one or more welding heads without exceeding said preselected power level.

4,034,213

ILLUMINATING INSERT FOR A DRINKING GLASS

Frank John Norris, Ossining, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed July 14, 1975, Ser. No. 595,386
Int. Cl.² F21V 33/00; F21L 11/00
U.S. Cl. 240—6.4 G 3 Claims

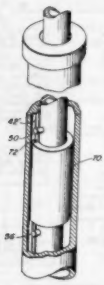
1. An illuminating insert for a drinking glass, comprising:
a terminal,
a first mercury battery connected to the terminal,
a second mercury battery connected in series to the first mercury battery,
the second battery connected to the terminal, whereby the electrical circuit can be completed,
the terminal, batteries and connections mounted in a molding plastic,
the molding plastic forming a slot, and
a light emitting diode cap physically and electrically connectable to the terminals.

4,034,214

MULTIPLE POSITION LAMP

Earle F. Chapman, Summer St., Marshfield, Mass. 02051, and Bernard J. Ruskin, 17 Sheldon Road, Marblehead, Mass. 01945

Filed Mar. 4, 1976, Ser. No. 663,972
Int. Cl.² F21S 1/12, 3/10
U.S. Cl. 240—70 11 Claims



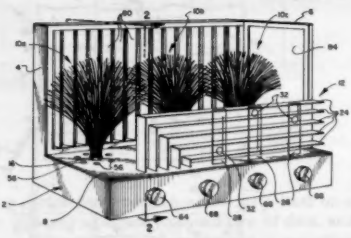
8. A multiple position lamp comprising:
a. a base;
b. a first tubular member, one end of said first tubular member mounted to said base, said first tubular member formed with a longitudinal rib projecting outwardly from an interior surface thereof;
c. a second tubular member having a pair of stops in spaced parallel alignment extending from an exterior surface thereof, said stops at one end of said second tubular member, said one end of said second tubular member received in said first tubular member, an annular chamber formed between said first and second tubular members;
d. a cylindrical guide formed with a longitudinal slot disposed in said chamber between said stops, said rib received in said slot;
e. said second tubular member vertically and rotatably adjustable in said first tubular member, said stops contacting said rib as said second tubular member is rotated in said first tubular member to limit said rotational movement to less than one revolution;
f. a cap mounted to the other end of said first tubular member, said cap formed with a concentric hole through which said second tubular member extends, upward vertical movement of said second tubular member relative to said first tubular member limited by one of said stops contacting said cap;
g. a receptacle adapted to receive at least one lamp; and
h. means for mounting said receptacle to the other end of said second tubular member.

4,034,215

DECORATIVE LIGHT DISPLAY

Hideo Hashimoto, 2618 Desert St., P.O. Box 1182, Rosamond, Calif. 93560

Filed Apr. 23, 1976, Ser. No. 679,802
Int. Cl.² A63J 17/00; F21P 1/02
U.S. Cl. 240—10 L 9 Claims



1. A decorative light display comprising
a chassis having a base housing and a back panel extending upwardly from a rear edge of the base housing
a plurality of fiber optic spray assemblies, each including a lamp and optical fibers, mounted on top of the base housing so that the optical fibers extend upwardly in front of the back panel,
means responsive to an audio input signal for supplying power to said lamps, said power varying with variations in the audio signal, and
a plurality of vertically oriented mirrored panels fixed in said back panel adjacent the spray assemblies, each mirrored panel being positioned at substantially a right angle with respect to immediately adjacent mirrored panels.

4,034,216

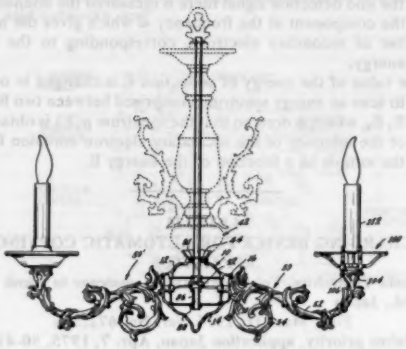
LIGHTING FIXTURE

Robert B. Webster, Huntington Beach, and Charles Gretz, Calabasas, both of Calif., assignors to Robert B. Webster, Huntington Beach, Calif.

Filed June 19, 1975, Ser. No. 588,369
Int. Cl.² F21S 1/06; H02B 1/10
U.S. Cl. 240—78 F 6 Claims

1. An ornamental chandelier construction, comprising:
central box member adapted to contain electrical wiring; said central box member having openings therein for permitting electrical wiring to pass therethrough;
central, ornamental structure connected to and enclosing said central box member so as to cover said central box member and present an ornamental appearance; and
plurality of chandelier arms connected to said central box member and said central, ornamental structure;
each of said chandelier arms including an inner tubular

member adapted to contain electrical wiring, and an ornamental design configuration molded on said tube;



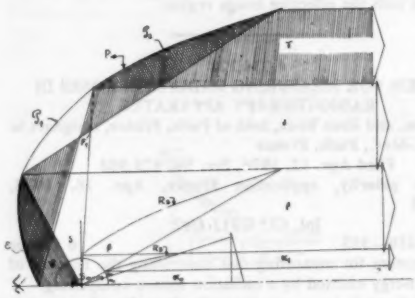
the interior of said tube of each of said chandelier arms communicating with the interior of said central box member via one of said openings in said central box member.

4,034,217

OPTICAL DEVICE FOR LIGHTING APPARATUS, WITH A PLURALITY OF COMBINED REFLECTORS

Roger Louis Dumont, 8, Rue de La Mesange, Thionville, Moselle, France

Filed June 20, 1975, Ser. No. 588,681
Claims priority, application France, June 21, 1974, 74.21695; Apr. 18, 1975, 75.12254
Int. Cl.² F21V 7/00
U.S. Cl. 240—103 R 11 Claims



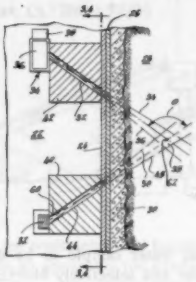
1. An optical device for a luminous source for producing a beam of light having an axis, said device comprising first, second and third reflecting surfaces, said first surface being described by an arc of an ellipse having a first focus coincident with said luminous source and a second focus, said second reflecting surface being described by an arc of a parabola having an axis parallel to the axis of the beam of light, the focus of said parabola being coincident with said second focus of said ellipse and said third reflecting surface described by an arc of a curve of second degree positioned between said second reflecting surface and said axis, the focus of said third surface coincident with said source.

4,034,218

FOCUSED DETECTION LOGGING TECHNIQUE

Ronald E. Turcotte, West Redding, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Oct. 9, 1975, Ser. No. 620,972
Int. Cl.² G01V 5/00
U.S. Cl. 250—269 7 Claims



1. A well logging method comprising the steps of:

a. emitting from a given location gamma radiation in at least one tightly collimated beam toward the media surrounding a borehole;

b. detecting at a predetermined distance from said location gamma radiation that is tightly collimated to a plurality of paths focused to a zone of intersection with and aligned to intersect with said emitted gamma radiation beam so that the radiation detected includes singly scattered gamma radiation produced by the intersection of emitted gamma radiation and the media at said zone of intersection;

c. misaligning the beam emitted from said location and the tightly collimated paths to prevent their intersection;

d. detecting at said predetermined distance, with the emitted beam and the tightly collimated paths misaligned, principally gamma radiation multiply scattered by the interaction of the emitted gamma radiation and the media; and

e. subtracting the gamma radiation detected during misalignment from the gamma radiation detected during alignment to obtain a measurement of said singly scattered gamma radiation which is related to a density characteristic of the media at the zone of intersection.

4,034,219

CLEANING SYSTEM FOR A CONTINUOUS SENSING OIL-IN-WATER MONITOR

Lester Richard Louden; Clement Auguston Blessington, and Jerry Lon Beatty, all of Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Apr. 22, 1976, Ser. No. 679,297
Int. Cl.² G01T 1/169
U.S. Cl. 250—301 2 Claims

1. Apparatus for sensing oil in a water sample, comprising:

a sample tube;

light source means for directing light energy into said sample tube;

detector means for detecting light energy characteristic of oil emanating from said sample tube;

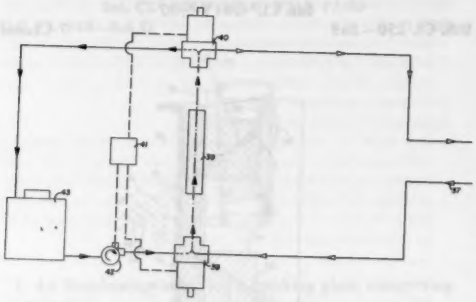
sample conduit means for channeling said water sample, said sample conduit means having a sample outlet end;

a source of cleaning solution;

cleaning solution conduit means connected to said source of cleaning solution, said cleaning solution conduit means having a cleaning solution outlet end; and

valve means for directing said water sample and said cleaning solution through said sample tube, said valve means having a first port connected to said sample outlet end of

said sample conduit, a second port connected to said cleaning solution end of said cleaning solution conduit, a third port in communication with said sample tube, and means for selectively blocking said second port and allowing said water sample to be directed thorugh said sample tube and selectively blocking said first port and allowing said cleaning solution to be directed through said sample tube.



4,034,220
PROCESS AND APPARATUS FOR THE ELEMENTARY AND CHEMICAL ANALYSIS OF A SAMPLE BY SPECTRUM ANALYSIS OF THE ENERGY OF THE SECONDARY ELECTRONS

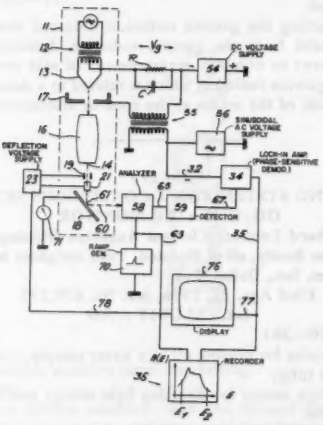
Claude le Gressus, Fontenay-le-Fleury; Daniel Massignon, Paris, and René Sopizet, Chevilly-Larue, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Dec. 16, 1975, Ser. No. 641,240

Claims priority, application France, Jan. 2, 1975, 75.00050; May 23, 1975, 75.16206

Int. Cl.² G01N *23/225*

U.S. Cl. 250—310 **17 Claims**



1. Process of elementary and chemical analysis of a sample by analysing energy spectra of secondary electrons emitted by the said sample when it is subjected to a beam of monoenergetic primary electrons concentrated on its surface, characterised in that:

the intensity of the beam of monoenergetic primary electrons emitted by an electron gun is modulated in accordance with a sinusoidal law at a frequency ω,

the beam of secondary electrons having an energy E is collected,

the intensity of the said collected beam is detected by generating an electrical detection signal proportional to the said intensity,

in the said detection signal there is measured the intensity of the component at the frequency ω which gives the number of secondary electrons, corresponding to the said energy,

the value of the energy of collection E is changed in order to scan an energy spectrum comprised between two limits E_1 E_2, which is done so that the spectrum $n(E)$ is obtained of the intensity of the secondary electron emission from the sample as a function of the energy E.

4,034,221
CHARGING DEVICE FOR AUTOMATIC COPYING APPARATUS

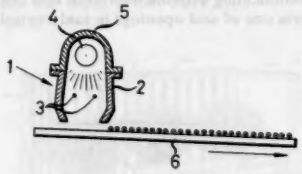
Tadashi Yamashita, Yokohama, Japan, assignor to Ricoh Co., Ltd., Japan

Filed Mar. 31, 1976, Ser. No. 672,236

Claims priority, application Japan, Apr. 7, 1975, 50-41185

Int. Cl.² G03G *15/00*

U.S. Cl. 250—324 **9 Claims**



1. A charging device for automatic copying apparatus comprising:

a. a charger case;

b. charging wires arranged in said charger case;

c. a charging circuit for supplying a charge voltage to said charging wires, said charging circuit impressing a charge voltage to said charging wires at all times while copying condition of the apparatus;

d. a plurality of lamps disposed in the rearward position of the charger case; and

e. a control circuit turning on and off said lamps so as to bring the charged zone of a photoconductor into agreement with the effective image region.

4,034,222
SYSTEM FOR MEASURING RADIATION DOSES IN RADIOTHERAPY APPARATUS

Guy Azam, and Rene Boux, both of Paris, France, assignors to C.G.R.-Mev., Paris, France

Filed Apr. 12, 1976, Ser. No. 675,903

Claims priority, application France, Apr. 16, 1975, 75.11759

Int. Cl.² G01J *1/42*

U.S. Cl. 250—355 **6 Claims**

1. A system for measuring and controlling the amount of radiant energy emitted by a radiation source comprising:

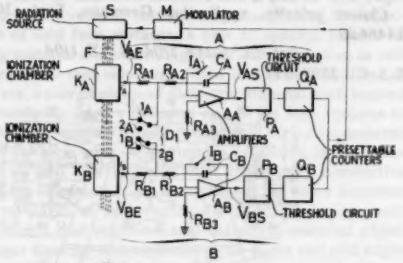
radiation-sensing means in the path of a radiant beam originating at the radiation source to be controlled;

a pair of substantially identical metering networks connected to said radiation-sensing means for generating and accumulating respective electrical parameters proportional to the sensed radiation;

adjustable delay means in each of said networks for selectively retarding the accumulation of the generated electrical parameter in either of said networks whereby one of said networks operates as a controller normally reaching a predetermined limit for the accumulated electrical parameter earlier than the other of said networks;

disabling means connected to said networks for deactivating said source upon attainment of said predetermined limit

by either of said networks, said other of said networks serving as a backup taking over the control of said disabling means in the event of a malfunction of said one of said networks; and

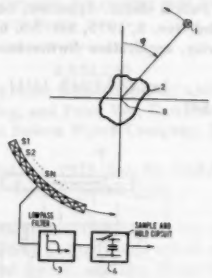


switchover means coupled with said adjustable delay means for selectively interchanging the roles of said networks as a controller and as a backup.

4,034,223
DEVICE FOR MEASURING RADIATION ABSORPTION

Gunter Kowalski, Hamburg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 28, 1976, Ser. No. 653,111
Claims priority, application Germany, Jan. 30, 1975, 2503789
Int. Cl.² G01T 1/20
U.S. Cl. 250—369 4 Claims



1. In apparatus for measuring the absorption of radiation in a plane of a body of the type wherein a radiation source and a plurality of detectors are arranged in the same plane on opposite sides of the body and uniformly moved relative to the body at a constant speed, the improvement comprising, with respect to each detector:

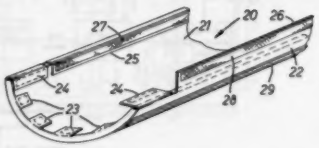
means for removing from the output signal of the detector all absorption signal frequency components which are above a limit frequency; and

means for periodically sampling the frequency limited absorption signal of the detector, the limit frequency being approximately half of the sampling frequency to thereby avoid sampling errors.

4,034,224
PATIENT POSITIONING AND SUPPORTING ARRANGEMENT

Michael Heavens, Hillingdon; Richard Charles James, Uxbridge, and Dennis Stanley Slinn, West Drayton, all of England, assignors to EMI Limited, Hayes, England

Filed Apr. 12, 1976, Ser. No. 676,056
Claims priority, application United Kingdom, Mar. 25, 1976, 11959/76
Int. Cl.² H01J 37/20
U.S. Cl. 250—439 P 9 Claims

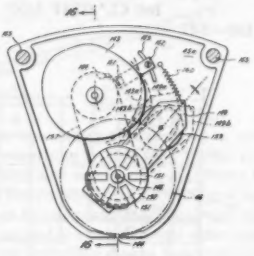


1. An arrangement for positioning and locating the body of a patient in relation to an apparatus for irradiating the body with penetrating radiation, the arrangement comprising a curved platter upon which the patient can be disposed, a table having a curved groove to accommodate the platter, and means for driving the platter slidably along the groove; the platter comprising a substantially rigid platform shaped to conform to said curved groove.

4,034,225
FILM DRIVE MECHANISM FOR PANORAMIC RADIOGRAPHIC APPARATUS

Donald C. Hudson; Charles R. Morris; Horst G. Fleck, and Karl A. Senghaas, all of San Antonio, Tex., assignors to Pennwalt Corporation, S.S. White Dental Products Division, Philadelphia, Pa.

Division of Ser. No. 429,482, Jan. 2, 1974, Pat. No. 3,908,126.
This application Apr. 24, 1975, Ser. No. 571,265
Int. Cl.² G11B 1/00
U.S. Cl. 250—471 15 Claims



1. A film drive mechanism for moving an x-ray film past an x-ray slit at a variable rate of speed as a function of the shape of a desired focal trough while the film drive mechanism including the x-ray film is being moved about an object to be x-rayed, comprising, in combination:

a film holder having an x-ray slit;

a movable film cassette for mounting in said film holder, said film cassette adapted to support and move an x-ray film past said slit;

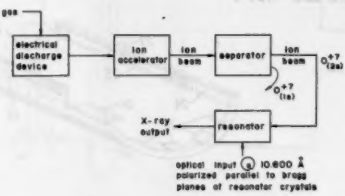
motor means connected to drive said film cassette, said motor means including a rotatable shaft and a housing; and

means coupled between said shaft and housing to vary the speed of rotation of said shaft with respect to said housing by selectively rotating said housing with respect to said shaft as a function of the shape of a desired focal trough.

4,034,226
METHOD OF AND MEANS FOR PRODUCING RADIATION IN THE X-RAY REGION

Isaac Freund, Petah Tiqva, Israel, assignor to Bar-Ilan University, Ramat-Gan, Israel

Filed May 29, 1974, Ser. No. 474,329
Claims priority, application Israel, May 30, 1973, 42398
Int. Cl.² H01S 4/00
U.S. Cl. 250—493 10 Claims

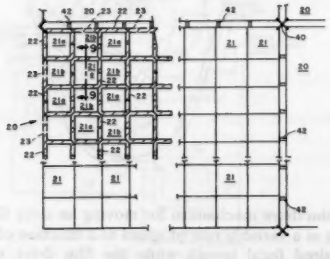


1. A method for producing emission of radiation in the X-ray region at a frequency ω_2 comprising the steps of: selecting as an active medium a system having the following properties; two energy levels separated by an energy difference ΔE corresponding to radiation of frequency ω_1 in the X-ray region such that a transition from the upper to the lower of the two levels by one-photon emission is weakly allowed or strictly forbidden, one of the two levels having nearly degenerate partner level optically coupled thereto such that a transition therebetween by one-photon emission has a high probability; subjecting the active medium to radiation at a frequency ω_1 that is substantially equal to the frequency of the optical coupling between the nearly degenerate levels but much smaller than the frequency ω_1 such that $\omega_2=\omega_1\pm\omega_1$; and polarizing the radiation of frequency ω_1.

4,034,227
NUCLEAR FUEL STORAGE RACK

Olaf Soot, 9 Tomahawk Lane, Greenwich, Conn.

Filed Feb. 2, 1976, Ser. No. 654,475
Int. Cl.² G21F 5/00
U.S. Cl. 250—507 18 Claims

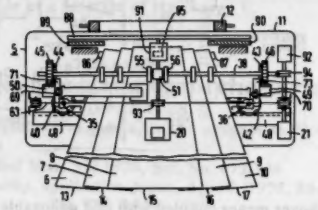


1. Nuclear fuel storage rack comprising a plurality of elongated, corner-adjoining, parallel enclosures each of generally rectangular cross-section having interior slots for receiving fuel elements, and structural means permanently joining each of the fuel receiving enclosures directly to its neighboring enclosures along portions of their adjoining corners distributed along their length and in checkerboard fashion to form a rigid honeycomb structure wherein the walls of individual enclosures through their corner connections form a plurality of rigid shear walls extending in two directions across the rack and wherein the number of fuel-receiving slots present is approximately equal to twice the number of enclosures present.

4,034,228
TUBUS FOR DETERMINING THE BOUNDARIES OF A BEAM OF PENETRATING RAYS

Alfred Arauner, Furth, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 29, 1975, Ser. No. 617,579
Claims priority, application Germany, Sept. 30, 1974, 2446680
Int. Cl.² G21F 5/04; G21K 1/04
U.S. Cl. 250—511 7 Claims

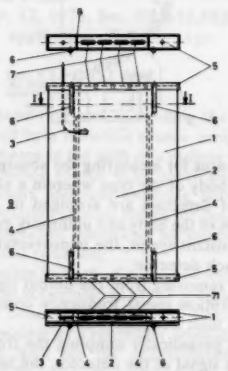


1. In a tubus for defining the boundaries of a beam of penetrating rays including a tubus housing, a plurality of mutually overlapping wall elements forming a tubus wall structure in parallel with the direction of edge radiation of a ray cone encompassed by the tubus, means for suspending the wall elements on the tubus housing for displacement perpendicular to the direction of edge radiation, the improvement comprising shaft means having a longitudinal axis for guiding and pivoting the wall elements of each tubus side for a suspension in the virtual focal point of a radiation source, the tubus having a symmetrical axis, said shaft means being supported on the tubus housing, displaceable at right angles to said longitudinal axis and extending in parallel with the tubus side associated therewith, and perpendicular to the symmetrical axis of the tubus; lever means for controlling the inclination of the wall elements with respect to the tubus symmetrical axis; and guide means for guiding said lever means.

4,034,229
OZONE GENERATING APPARATUS

Walter Grossen, Riehen; André Gagnaux, Kaiseraugst, and Edgar Chariatte, Oberwil, all of Switzerland, assignors to Fr. Sauter AG., Fabrik elektr. Apparate, Basel, Switzerland

Filed Nov. 5, 1975, Ser. No. 628,929
Claims priority, application Switzerland, June 10, 1975, 7487/75
Int. Cl.² C01B 13/11
U.S. Cl. 250—541 12 Claims



1. Apparatus for generating ozone by corona discharge,

comprising first electrode means and second electrode means, said first electrode means comprising at least one assembly, said assembly comprising a first electrode consisting of an electrically conductive plate having a pair of oppositely directed face surfaces, a pair of side edges extending along the opposite sides of said face surfaces and a pair of end edges extending transversely of the side edges and along the opposite ends of said face surfaces, a pair of spacers formed of insulating material and extending in the same direction as said side edges, each said side edge fitted into a different one of said spacers, a pair of plates of dielectric material each located spaced outwardly from a different one of the face surfaces of said electrically conductive plate, each said dielectric material plate comprising a pair of side edges extending in the same direction as said side edges of said electrically conductive plate and a pair of end edges extending in the same direction as said end edges of said electrically conductive plate, said side edges and end edges of said dielectric material plates being longer than the corresponding side edges and end edges of said electrically conductive plate, said spacers having a length corresponding to the length of the side edges of said dielectric material plates, a pair of end portions disposed in spaced relation and extending in the same direction as said end edges of said dielectric material plates, each said end portion having one end edge of each said dielectric plate inserted therein, the opposite ends of said spacer being located within said end portions, each said spacer extending in the direction between the face surfaces of said electrically conductive plate between the facing surfaces of the pair of said dielectric material plates and said end portions, said spacers, and the facing surfaces of said dielectric material plates defining a discharge space containing said electrically conductive plate and within which ozone is generated, one of said end portions having at least one first opening therein for admitting gas to said discharge space, the other said end portion having at least one second opening therein for the outflow of ozone gas from the discharge space, a conduit for receiving ozone from said second opening, means for sealing said second opening to said conduit, said second electrode means comprising at least two said second electrodes associated with each said assembly and each said second electrode located adjacent a different one of said dielectric material plates, each said second electrode comprising an electrically conductive plate member, and means for contacting said plate member with the adjacent said dielectric material plate of said first electrode so that in use a corona discharge occurs in said discharge base, and means for cooling said second electrode means with a fluid medium.

4,034,230

ELECTRO-OPTICAL BAR-CODE SCANNING UNIT

Henry Brill, Flushing, and Peter Yee, East Northport, both of N.Y., assignors to Bulova Watch Company, Inc., New York, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,687
Int. Cl.² G06K 7/10
U.S. Cl. 250—568 **8 Claims**

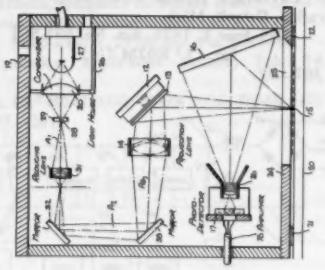
1. An electro-optical directional scanning unit adapted to sense a bar-code pattern printed on an article and to generate corresponding digital signals, said unit comprising:

A. an incandesent light source;

B. optical means coupled to said source to produce an illuminated slit and including a reducing lens to project a reduced scale image of said illuminated slit along an optical path to create a luminous line in a focal plane;

C. an optical scanner interposed in said optical path to cause said luminous line to sweep back and forth periodically within said focal plane;

D. means to confine said article at a position on which the bar-code printed thereon lies in said focal plane with its bars parallel to said luminous line whereby the light from said line is reflected to produce modulated light pulses, said confining means being constituted by a channel whose dimensions conform to that of the article and having a window therein to expose said bar code pattern; and



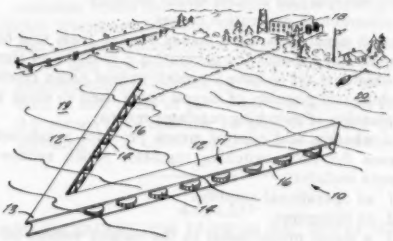
E. means to detect said light pulses to generate said digital signals.

4,034,231

OCEAN TIDE AND WAVE ENERGY CONVERTER

John L. Conn, and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007

Filed Apr. 28, 1975, Ser. No. 541,051
Int. Cl.² F03B 13/10, 13/12
U.S. Cl. 290—53 **1 Claim**



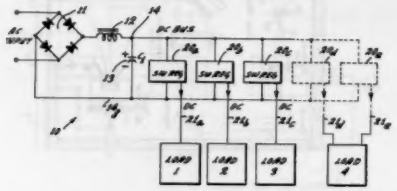
1. A machine for converting tidal and wave energy into electrical energy comprising a V-shaped frame emersed in water subjected to tidal and wave action said frame having an apex directed away from a shore line with integral legs diverging along linear axes towards said shoreline, said legs having aligned parallel upper and lower horizontal sides integral with transverse side walls, including means mounted movably in said legs, wherein said means include a vertical member intersecting the said linear axis of said legs at right angles thereto, in further combination with an electric generator and means for transmitting the motion of the first said means to drive the generator, in further combination with an electric cable connecting the generator to a power station for distribution of the generated electric energy wherein the first said means comprises a float secured to a vertically slidable shaft mounted on said frame, including toothed racks on said shaft engaging a pair of gears affixed on a pair of horizontal shafts journalled in said side walls symmetrically about said linear axis wherein said horizontal shafts are connected by slip clutches to a second pair of horizontal shafts which in turn are geared to drive said generator including means for causing one of said clutches to engage only upon vertical upward movement of the vertical shaft and the other of said clutches to engage only upon vertical downward movement of said vertical shaft.

4,034,232

SYSTEM FOR SYNCHRONIZING AND PHASE SHIFTING SWITCHING REGULATORS

Orville W. LaVenture, Covina, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed June 1, 1976, Ser. No. 691,867
Int. Cl.² H02M 5/453
U.S. Cl. 307—32 4 Claims



4. In a regulated power supply system for supplying a plurality of separate unregulated D.C. voltages to a plurality of loads, the combination comprising:

a. means for converting A.C. voltage to an unregulated D.C. voltage;

b. a plurality of switching regulator means for controlling said unregulated D.C. voltage to provide a plurality of constant D.C. outputs for delivery to a plurality of loads;

c. control means for determining a common frequency of switching for said plurality of switching regulator means and for determining the switch-on duration time of each cycle of each of said switching regulator means, said control means having individual subcontrol means responsive to the output voltage delivered to each of said loads in order to control the said switch-on duration time for each switching cycle of each of said switching regulators, wherein said control means includes:

common clock generation means;

phased signal generation means derived from said common clock means for generating a plurality of signals which are set to have a predetermined phase relationship, said plurality of signals being used to clock said plurality of switching regulator means;

and wherein said control means provides a subcontrol means for each switching regulator which subcontrol means includes:

c-1. an operational amplifier;

c-2. an integrator;

c-3. a signal proportional to the output voltage of the individual switching regulator at its load;

c-4. a reference voltage;

c-5. a plurality of gates;

said operational amplifier receiving signals from said integrator and said proportional output voltage,

said integrator being clocked by a preselected phase signal from said phased signal generation means,

said gates being controlled by combined signals from said operational amplifier and from said preselected phase signals of said phased signal generation means.

4,034,233

POWER MONITORING AND REGULATING CIRCUIT AND METHOD HAVING AN ANALOG INPUT REPRESENTING POWER RATE AND A DIGITAL OUTPUT FOR CONTROLLING THE ON/OFF STATES OF A PLURALITY OF LOADS

Warren L. Leyde, Seattle, Wash., assignor to Pacific Technology, Renton, Wash.

Filed July 22, 1976, Ser. No. 707,566
Int. Cl.² H02J 3/00
U.S. Cl. 307—41 9 Claims

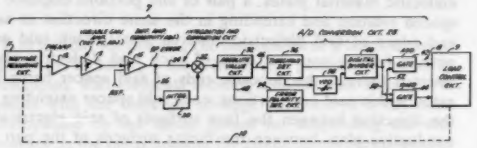
1. A closed loop power monitoring and load control system, comprising the combination of:

analog measuring means for measuring the rate of power delivered to a plurality of electrical loads, said analog measuring means having an output at which an analog signal is produced that has a predetermined relationship to said rate;

reference signal source means for producing a reference signal;

electrical difference taking means responsive to said analog measuring means and to said reference signal source means for producing an analog error signal that represents the difference between said analog signal and said reference signal, said analog error signal having a nominal level when the rate of power delivered to the electrical loads equals a desired rate and deviating from said nominal level in a first direction when such rate of power exceeds the desired rate and deviating from said nominal level in a second direction when such rate of power falls below the desired rate;

analog to digital conversion circuit means including a threshold detector means for detecting when said analog error signal deviates from said nominal level by a predetermined amount in either of said first or second directions;



said analog to digital conversion circuit means further including first and second digital outputs, said first digital output producing a digital shed signal commanding that a load be shed when said threshold detector means detects that said analog error signal has deviated from said nominal level by said predetermined amount in said first direction, and said second digital output producing a digital add signal commanding that a load be added when said threshold detector means detects that said analog error signal has deviated from said nominal level by said predetermined amount in said second direction; and

load control circuitry means having an input responsive to said first digital output of said analog to digital conversion circuit means for disconnecting one of a plurality of electrical loads in response to said digital shed signal, and having another input connected to said second digital output of said analog to digital conversion circuit means for connecting one of a plurality of electrical loads in response to said digital add signal.

4,034,234

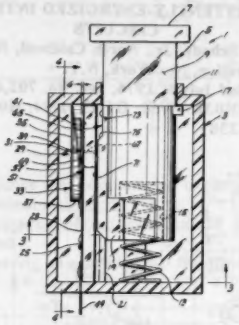
SWITCHING MODULE FOR SOLID-STATE KEYBOARD

Brian C. Ehlers, Barrington, and Henry J. Boulanger, Cumberland, both of R.I., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 10, 1975, Ser. No. 535,893
Int. Cl.² H01H 35/00
U.S. Cl. 307—116 11 Claims

1. A switching module for a solid-state keyboard or the like comprising an actuating key manually movable between a first and a second position, a variable capacitor comprising a rigid stationary electrode and another electrode movable toward and away from said stationary electrode between a first position in which said electrodes are separated by an air gap and a second position in which said air gap is substantially eliminated for effecting a change in capacitance in said variable capacitor, said movable electrode having a rigid dielectric material secured thereto on its side toward said stationary electrode, said dielectric member having a dielectric constant substantially greater than air, biasing means comprising a unitary member of resilient electrically conductive metal

having a plate portion constituting said movable electrode and a frame surrounding said plate portion and being secured thereto at one locale but being free of said plate portion elsewhere therearound for permitting movement of said plate portion relative to said frame, the latter being secured to a



substrate opposite said one locale, and said module further comprising means coupling said actuating key and said movable electrode for effecting movement of said movable electrode and said dielectric member between its said first and second position in response to movement of said actuating key between its first and second positions.

4,034,235

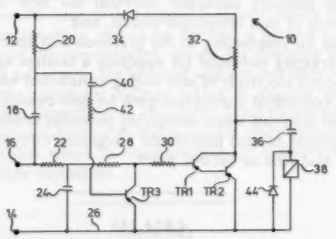
CIRCUITS

Kenneth Robinson Wade, Parbold, England, assignor to Product Automation and Control Limited, England

Filed Dec. 22, 1975, Ser. No. 643,058

Int. Cl.² H01H *47/26*

U.S. Cl. 307—117 **13 Claims**



1. A flame detection circuit comprising probe means connectible to a source of alternating signal and locatable in a combustion area of a flame to apply said alternating signal across the flame for rectification thereby; first semiconductor switch means connected to said probe means and triggerable by said alternating signal to convert the rectified signal into a pulsed signal; a capacitance connectible to a source of direct current signal to be charged thereby; relay means connected to said capacitance; and second switch means actuable by each pulse of said pulsed signal to discharge said capacitance through said relay means whereby to actuate said relay means.

4,034,236

DEVICE FOR FORMING A BIPOLAR SIGNAL OF 50% DUTY CYCLE

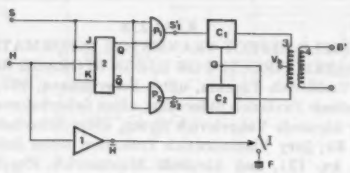
André A. Aveneau, Clamart, and Guy A. de Passoz, Lesigny, both of France, assignors to Societe Anonyme de Telecommunications, Paris, France

Filed Feb. 6, 1976, Ser. No. 655,681

Claims priority, application France, Feb. 14, 1975, 75.04644

Int. Cl.² H04J *3/00*; H03K *5/00*; H04B *3/00*

U.S. Cl. 307—261 **8 Claims**



1. Apparatus for forming a bipolar signal of alternating polarity, having a duty cycle of ½ when alternating polarity signal elements succeed each other with minimum interpulse intervals, in response to a binary signal in the form of a succession of binary elements 0 and 1 of duration T, comprising, in combination:

means for producing, at two respective outputs of said means, in response to said binary signals, two trains of pulses of duration T respectively corresponding to alternate signal elements 1 of duration T of said binary signals;

interruptible means, having a pair of inputs respectively connected to said outputs of said pulse train producing means, for applying said two trains of pulses respectively to a pair of oppositely poled inputs of a balanced-input output coupling device, said coupling device having a common return terminal for said inputs thereof, and

means interposed between said common return terminal and said interruptible means for interrupting the operability of said interruptible means for periods respectively corresponding to one half of the duration of each pulse of both of said trains of pulses and allowing said interruptible means to be operable for periods respectively corresponding to the other half of each of said pulses.

4,034,237

DRIVE CIRCUIT FOR ULTRASONIC LEVEL GAUGE

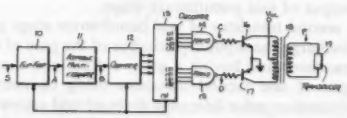
Hiroshi Minami, Kawasaki, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Mar. 22, 1976, Ser. No. 668,845

Claims priority, application Japan, Mar. 31, 1975, 50-43715[U]

Int. Cl.² H03K *5/01*, *13/00*

U.S. Cl. 307—268 **6 Claims**



1. A drive circuit for supplying AC power having a sharp rise at the beginning of transmission and a sharp fall at the end thereof to excite an ultrasonic transducer transmitting an ultrasonic wave or the like, said circuit comprising:

A. a gate-controlled astable multivibrator producing during a gate period initiated by a start pulse a train of rectangular pulses of constant amplitude and constant frequency;

B. a counter coupled to the multivibrator to count the pulses produced thereby;

C. decoder means coupled to the counter to produce a first set of rectangular output pulses in response to oddnumbered counts and a second set of rectangular output pulses in response to even-numbered counts;

D. means alternately actuated by output pulses of the first and second sets to yield said AC power in the form of bipolar rectangular pulses whose frequency is one-half said constant frequency; and

E. means for terminating said gate period when said decoder means produces a reset pulse representing a predetermined maximum count.

4,034,238

FIELD EFFECT TRANSISTOR INFORMATION TRANSFER CIRCUIT FOR USE IN STORAGE REGISTER

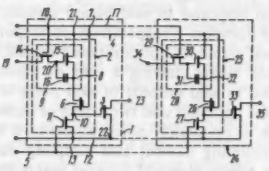
Jury Vasilievich Tayakin, ulitsa Scherbakova, 98v, kv. 109; Vladimir Pavlovich Sidorenko, ulitsa Scherbakova, 92v, kv. 29; Alexandr Yakovlevich Sirota, ulitsa Scherbakova, 74b, kv. 81; Jury Vladimirovich Prokofiev, ulitsa Scherbakova, 73, kv. 131, and Alexandr Maximovich Kopytov, ulitsa Karpinskogo, 3, all of Kiev, U.S.S.R.

Filed Nov. 24, 1975, Ser. No. 634,528

Claims priority, application U.S.S.R., Nov. 29, 1974, 2075539

Int. Cl.² G11C *19/28*

U.S. Cl. 307—221 C **1 Claim**



1. An output device of a metal-insulator-semiconductor transistor integrated circuit providing the transfer of information to the register involving time separation of character digits and comprising:

a. a penultimate stage and an output of said penultimate stage;

b. an output transistor, having a gate, a drain and a source, said gate of said output transistor being connected to said output of said penultimate stage, said drain of said output transistor being connected to the output of the output device;

c. a clock pulse line;

d. a separation pulse line;

e. a first transistor of said penultimate stage, provided to charge the gate capacitance of said output transistor, and having a gate, a drain and a source, said gate of said first transistor being connected to said clock pulse line; said source of said first transistor being connected to said output of said penultimate stage;

f. a second transistor of said penultimate stage provided to discharge the input capacitance of the gate of said output transistor and having a gate, a drain and a source, said gate of said second transistor being connected to said separation pulse line; said drain of said second transistor being connected to said output of the penultimate stage;

g. a follower of said penultimate stage; an input and an output of said follower; a terminal for gating information from said output of said follower; said input of said follower being an input of said output device of the metal-insulator-semiconductor transistor integrated circuit, said output of said follower being connected to said drain of said first transistor, said terminal for gating information from said output of said follower being connected to said clock pulse line; and

h. a common line; said source of said second transistor and said source of said output transistor being connected to said common line.

4,034,239

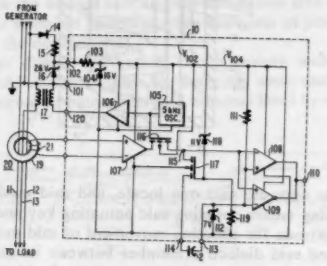
CAPACITANCE MEMORIES OPERATED WITH INTERMITTENTLY-ENERGIZED INTEGRATED CIRCUITS

Otto Heinrich Schade, Jr., North Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed July 6, 1976, Ser. No. 702,400

Int. Cl.² H03K *17/60*; G11C *11/34*; H01L *27/02*

U.S. Cl. 307—238 **4 Claims**



1. In a system including a memory capacitor together with a monolithic integrated circuit, said integrated circuit having a first point for connection to a point of reference potential and having a second point for making charge available for adding or subtracting to the charge on said memory capacitor, said monolithic integrated circuit being disposed on a substrate of semiconductor material of a first conductivity type having a surface covered by a layer of semiconductor material of a second conductivity type opposite to said first conductivity type, with means extending through said layer for dividing it into a plurality of isolation tubs and with means for defining the various circuit elements of said integrated circuit in separate ones of said isolation tubs, the improvement for substantially forestalling leakage of charge to or from said memory capacitor during intervals when energizing potential is not applied to portions of said monolithic integrated circuit connected to said first or second point, which improvement comprises:

an analog switch, having a control electrode and having a controlled conduction path for serial connection with said memory capacitor between the first and second points of said integrated circuit, and

means for responding to the presence and absence of said energizing potential for applying a control signal to the control electrode of said analog switch that will condition its controlled conduction path for non-conduction during said intervals when energizing potential is not applied to portions of said monolithic integrated circuit connected to said first or second point.

4,034,240

SINE-TO-SQUARE WAVE CONVERTER

Donald S. Foreman, Fridley, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 29, 1975, Ser. No. 645,068

Int. Cl.² H03K *17/00*

U.S. Cl. 307—252 F **10 Claims**

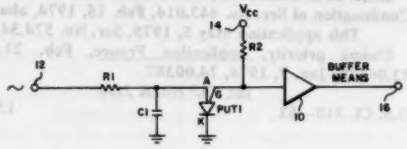
1. A circuit for producing a square wave output signal, the circuit comprising:

first terminal means adapted to receive an alternating current signal;

second terminal means adapted to receive a reference signal;

programmable unijunction transistor means having gate, anode, and cathode electrodes;

first impedance means connected to the anode and to the first terminal means for limiting current flow to the anode;



second impedance means connected to the gate and to the second terminal means;

capacitor means connected between the anode and the cathode; and

means for deriving an output signal from the gate.

4,034,241

VOLTAGE SENSITIVE TRIGGER CIRCUIT

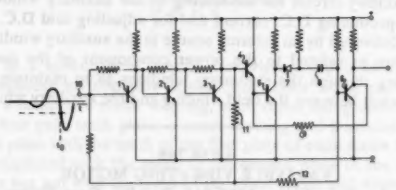
Cornelis Martinus van der Burgt, and Gerardus Andreas Van Maanen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 574,511, May 5, 1975, abandoned. This application May 17, 1976, Ser. No. 686,998

Claims priority, application Netherlands, May 21, 1974, 7406785

Int. Cl.² H03K *1/02, 1/14*

U.S. Cl. 307—264 **6 Claims**



1. A voltage sensitive trigger circuit which comprises a preamplifier and two cross-coupled alternately conducting trigger transistors biased to a quiescent state, the trigger circuit changing its conducting state when the input voltage exceeds a specific threshold level, means for deriving a first voltage from the base of that trigger transistor which conducts in the quiescent stage, means for deriving a second voltage at the output of the preamplifier, means for applying said first and second voltages to the input of said preamplifier in such a way that the quiescent voltage which is applied from the output of the preamplifier to the input of that trigger transistor which is non-conducting in the quiescent state experiences a threshold value which is compensated for temperature and supply voltage variations.

4,034,242

LOGIC CIRCUITS AND ON-CHIP FOUR PHASE FET CLOCK GENERATOR MADE THEREFROM

Richard H. Heeren, Palatine, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Aug. 25, 1975, Ser. No. 607,408

Int. Cl.² H03K *5/13, 3/353, 19/08, 19/20*

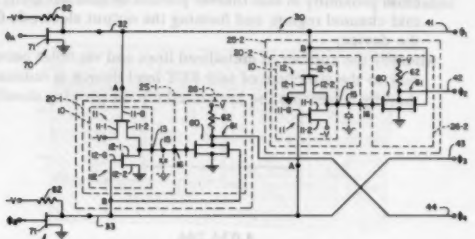
U.S. Cl. 307—269 **16 Claims**

1. A timer having two inputs and a single output, and utilizing combinations of a first voltage and a second voltage on said inputs to impress a predetermined one or the other of said voltages on said output, wherein the improvement comprises:

a first FET, the gate of which is said one input, and, a first controlled terminal of which is connectible to a source of said first voltage;

a second FET, the gate of which is said other input, a first controlled terminal of which is connected to a source of said second voltage; and, a second controlled terminal of which is connected to a second controlled terminal of said first FET;

a capacitance effectively interposed between said second controlled terminals and a source of said second voltage;



a two input, single output logical element means for providing said first voltage on its output if and only if both of its inputs have said second voltage thereon, and for providing said second voltage on its output for all other states of its inputs;

means for connecting a first of said logical element means inputs to said second controlled terminals; and

means for connecting the second of said logical element means inputs to the gate of said second FET.

4,034,243

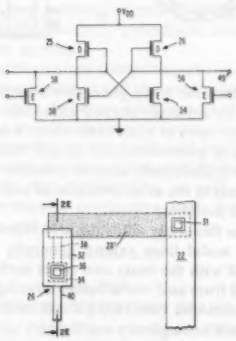
LOGIC ARRAY STRUCTURE FOR DEPLETION MODE-FET LOAD CIRCUIT TECHNOLOGIES

Robert D. Love, Burke; James W. Cullen, Fredericksburg, and Robert W. Kruppa, Manassas, all of Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 19, 1975, Ser. No. 642,513

Int. Cl.² H03K *3/353, 19/34;* **H01L** *29/78, 23/48*

U.S. Cl. 307—304 **21 Claims**



1. In an FET logic function layout including a spaced parallel array of horizontal diffusion segments in the surface of a semiconductor substrate, an insulating layer deposited over the surface of the substrate, and a spaced parallel array of vertical metallized lines deposited over the insulation layer, wherein an improvement in the configuration of an FET depletion mode load device in a static logic array, comprises:

a first one of said horizontal diffusion segments, to serve as the drain diffusion of the FET static load device;

a second one of said horizontal diffusion segments spaced from said first horizontal diffusion, to serve as the source diffusion of the FET static load device;

said first horizontal diffusion juxtaposed with said second horizontal diffusion and defining a channel region therebetween in said substrate;

said insulating layer having a thinner portion over said channel region and a via-hole perforation over said second horizontal diffusion;

a vertical metallized line deposited over said first and second diffusion segments, forming an electrically conductive source contact with said second horizontal diffusion through said via hole, forming the gate electrode by its close proximity in said thinner portion of said insulator, to said channel region, and forming the output electrode for the device;

whereby the number of metallized lines and via holes necessary to the structure of said FET load device is reduced, thereby increasing the horizontal circuit packing density.

4,034,244

RESONANT CYLINDRICALLY SHAPED ULTRASONIC WAVE GENERATOR

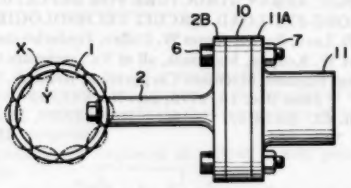
Kiyokazu Asai, and Akihiro Takeuchi, both of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Nagoya, Japan

Continuation of Ser. No. 453,987, March 22, 1974, abandoned. This application Sept. 5, 1975, Ser. No. 610,799

Claims priority, application Japan, Mar. 30, 1973, 48-365.04

Int. Cl.² H01L *41/04*

U.S. Cl. 310—8.2 **8 Claims**



1. An ultrasonic wave generator comprising:

a hollow cylindrically shaped ultrasonic frequency vibratory member open at both ends which has a side circular wall having a predetermined length between ends of said hollow cylindrically shaped member and a constant wall thickness in the axial direction of said hollow cylindrically shaped member;

means for flexurally vibrating said vibratory member so that plural nodal lines extend generally parallel to the axis thereof with the inner and outer surfaces of said member spaced from said nodal lines vibrating radially and equally in a harmonic vibration pattern comprising:

an ultrasonic frequency oscillator;

an ultrasonic electromechanical transducer for transforming electric oscillations generated by said ultrasonic frequency oscillator into mechanical longitudinal vibrations; and

an amplifier member for amplification of ultrasonic vibrations integrally connected to the output of said ultrasonic electromechanical transducer, said amplifier member having its output end integrally connected to said hollow cylindrically shaped ultrasonic frequency vibratory member with the axis thereof being in perpendicular relation to the axis of said vibratory member whereby said amplified mechanical longitudinal vibrations are converted to ultrasonic vibrations of both the inner and outer surfaces of said vibratory member.

4,034,245

SYNCHRONOUS ELECTRICAL MACHINE HAVING A SUPERCONDUCTIVE FIELD WINDING

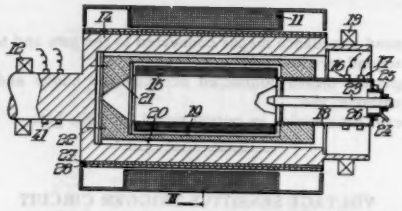
Alain Mailfert, Morsang-sur-Orge, and Michel Renard, Grenoble, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Continuation of Ser. No. 443,014, Feb. 15, 1974, abandoned. This application May 5, 1975, Ser. No. 574,342

Claims priority, application France, Feb. 21, 1973, 73.06118; Jan. 7, 1974, 74.00387

Int. Cl.² H02K *2/00*

U.S. Cl. 310—52 **13 Claims**



1. A polyphase synchronous electrical machine comprising a superconducting D.C. field winding for providing a rotating, at least bipolar magnetic field, stationary windings adapted to produce a field which rotates about the longitudinal axis of the machine when a polyphase alternating current flows through said windings; means for notatably supporting said field winding inside said stationary windings coaxially of a rotating torque transmission shaft carrying an auxiliary winding; and an exciting circuit for circulating in the auxiliary winding a field-producing D.C. current and for adjusting said D.C. current delivered by an external source in the auxiliary winding at a value so related to the power component of the current flowing through the stationary windings as to maintain synchronism between the field winding and the auxiliary winding.

4,034,246

VARIABLE VIBRATING MOTOR

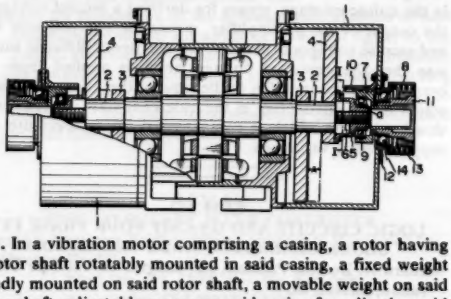
Akinobu Nakashima, 1592-365 Kamifu, Oaza-Shingu, Kasuya, Fukuoka, and Masanori Eshima, 1041-2, Oaza-Matsuzaki, Higashi, Fukuoka, both of Japan

Filed Sept. 25, 1975, Ser. No. 616,708

Claims priority, application Japan, Dec. 26, 1974, 50-990; July 2, 1975, 50-82104

Int. Cl.² H02K *7/06*

U.S. Cl. 310—81 **8 Claims**



1. In a vibration motor comprising a casing, a rotor having a rotor shaft rotatably mounted in said casing, a fixed weight fixedly mounted on said rotor shaft, a movable weight on said rotor shaft, adjustable means on said casing for adjusting said movable weight to various rotational positions about said rotor shaft, said adjustable means comprising a male threaded member extending coaxially from the longitudinal end of said rotor shaft, an urging sleeve threadedly engaging said threaded member, means connecting said urging sleeve to said movable weight, said movable weight being rotatably and slidably mounted on said rotor shaft, and manually operable

means outside of said motor casing for adjusting said adjustable means, said manually operable means being operable to rotate said urging sleeve and thereby varying the rotational position of said movable weight when the motor is running.

4,034,247
STRUCTURE FOR SYNCHRONOUS MOTOR, ESPECIALLY STEPPER MOTOR

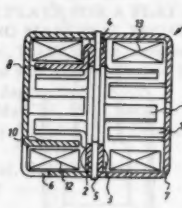
Eduard Wagensonner, Aschheim, and Herbert Wilsch, Unterhaching, both of Germany, assignors to AGFA-Gevaert, Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 28, 1975, Ser. No. 626,208

Claims priority, application Germany, Oct. 31, 1974, 2451876

Int. Cl.² H02K *19/00*

U.S. Cl. 310—164 **10 Claims**



1. In a synchronous motor, comprising, a pair of stators surrounding an armature space each stator being provided with a respective stator winding, each stator being comprised of a first pole teeth plate, a stator housing and a second pole teeth plate with the teeth of the first plate of each stator being interdigitated with the teeth of the second plate of the same stator but not with the teeth of the other stator and extending generally in axial direction of the motor radially outwardly of the armature space but radially inwardly of the respective stator winding, the angular spacing between a point on a pole tooth of the first plate of one stator and the corresponding point on the neighboring pole tooth of the second plate of the same stator constituting one pole pitch, the stators being arranged coaxially but angularly offset relative to each other by half the pole pitch, the first plates being identical to each other and arranged back-to-back with the second plates being separated from each other by the two first plates, each first plate having at its outer periphery a first engaging portion, each stator housing having a complementary second engaging portion, the first engaging portion of each first plate cooperating with the complementary second engaging portion of the housing of the same stator to establish the angular relationship between such first plate and such stator housing, each first engaging portion on a first plate being angularly offset relative to the neighboring tooth of the same first plate by half the pole pitch, each second engaging portion on a stator housing being angularly offset relative to the neighboring tooth of the second plate of the same stator by half the pole pitch, each first plate having at least two third engaging portions, on each first plate the first engaging portion and the neighboring tooth of the same plate together defining an angle which is bisected by a line relative to which the third engaging portions of the same plate are symmetrically disposed, the third engaging portions of one first plate congruently registering with the third engaging portions of the other first plate, with the first engaging portion of one first plate being angularly offset relative to the first engaging portion of the other first plate by half the pole pitch.

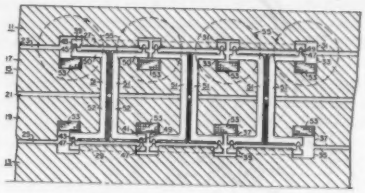
4,034,248
SEGMENTED MAGNET HOMOPOLAR TORQUE CONVERTER

Cecil J. Mole, Monroeville, and William C. Brenner, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 346,534, March 30, 1973, now Defensive Publication No. T921,004. This application Aug. 22, 1975, Ser. No. 607,009

Int. Cl.² H02K *31/00*

U.S. Cl. 310—178 **7 Claims**



1. A torque converter comprising:

first and second rotating members;

a plurality of electrically conductive lengths carried by said rotating members;

a stationary structure positioned between said rotating members;

magnetic flux producing means mounted in said stationary structure producing lines of flux through which said conductive lengths pass;

current collecting means to convey current from said conductive lengths carried by said rotating members to said stationary structure;

stationary interconnecting means passing through said stationary structure to provide a closed loop through said conductive lengths carried by said first rotating member, said current collector means, and said conductive lengths carried by said second rotating member;

adjacent ones of said conductive lengths being electrically connected to form continuous conductors carried by said rotating members;

said first and second rotating members being inner and outer, respectively, generally cylindrical members concentric with one another;

said current collecting means comprising projeting rings on said inner rotating member and the outer portion of said stationary structure between said conductive lengths, grooves formed in said stationary structure and in said outer rotating member to mate with said projecting rings on said inner rotating member and said stationary member, respectively, and liquid metal in said grooves to provide an electrically conductive path between said projecting rings and said grooves.

4,034,249
COMMUTATOR ROUNDING BRUSH

Ralph W. Avery, Erie, Pa., assignor to General Electric Company, Erie, Pa.

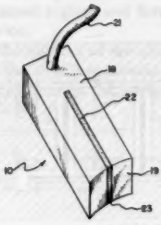
Filed Aug. 5, 1976, Ser. No. 711,941

Int. Cl.² H02K *13/00*; H01R *39/56*

U.S. Cl. 310—253 **19 Claims**

1. An improved electrically conductive brush of the type used in dynamoelectric machinery including a rotated part, such as a commutator or a slip ring, said part comprising electroconductive material such as copper, having an exposed convex surface and said machinery further including means for holding the brush and for biasing a contact surface thereof toward said exposed surface to provide an electric current conducting, sliding contact between the brush and the rotated part, wherein the improvement comprises an abrasive element longitudinally interposed in said brush, said element having

one end extending across and forming a central portion of said contact surface, which portion has a relatively small area and is disposed generally parallel to and midway between leading and trailing edges of said brush, said contact surface being so arranged that with said brush continuously in contact with said rotated part the central portion of said contact surface will frictionally engage high spots of said exposed surface where the exposed surface has a radius of curvature less than its average radius of curvature but will not engage low spots of



said exposed surface where the radius of curvature is greater than average, said element having such dimensions and abrasive content that in operation it removes electroconductive material from said exposed surface of the rotated part at a rate faster than the rate of electrical erosion of said material, whereby the improved brush when utilized in said machinery will cause selective abrasive wear of any high spots on said exposed surface and thus restore and maintain a substantially round profile on said rotated part.

4,034,250

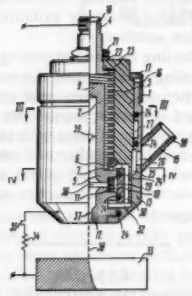
PLASMATRON

Jury Yakovlevich Kiselev, ulitsa Chernomorskaya, 3, kv. 53; Alexandr Mikhailovich Merkher, ulitsa Tolbukhina, 34, kv. 34, both of Kishinev, and Stanislav Antonovich Sokolovsky, ulitsa Entuziastov, 27, kv. 85, Kiev, all of U.S.S.R.

Filed Aug. 16, 1976, Ser. No. 714,604

Int. Cl.² H01J *1/50, 7/24;* **H05H** *1/02*

U.S. Cl. 313—32 **4 Claims**



1. A plasmatron comprising:

a casing having a first butt and a second butt;

a power lead-in positioned in the first butt of said casing;

a cylindrical hollow electrode positioned in said casing at a certain distance from said lead-in and having a bottom facing said lead-in and a butt end;

a lead-in coil having a first end and a second end and enveloping said cylindrical hollow electrode and positioned with a clearance between said electrode and said coil, the first end of said coil being connected to said lead-in and the second end being connected to said butt of said cylindrical hollow electrode;

an annular vortex generator made of insulating material positioned in said casing along its periphery and having a first butt and a second butt and at least one passage tangential to the inner annular surface of said vortex generator, the first butt being in contact with said butt of said electrode;

a nozzle positioned in the second butt of said casing and being in contact with the second butt of said annular vortex generator;

a means of supplying cooling water into said clearance between said electrode and said coil, to said nozzle and of removing said water therefrom;

a means of supplying air through said passage of said vortex generator into the space of said electrode;

a means of supplying said electrode and said nozzle with electricity.

4,034,251

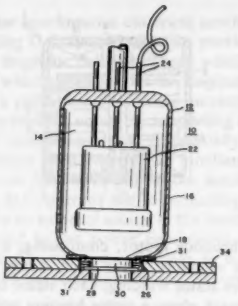
TRANSMISSION X-RAY TUBE

David J. Haas, Stamford, Conn., assignor to North American Philips Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,698

Int. Cl.² H01J *35/00*

U.S. Cl. 313—59 **6 Claims**



1. A transmission x-ray tube, comprising:

a. an envelope comprising a wall structure;

b. means for generating a charged particle beam;

c. x-ray permeable window means disposed at said wall structure;

d. means for directing said particle beam to said window means to produce x-rays;

e. structural means for providing a space at said window means, and comprising wall means and an x-ray permeable window element disposed opposite said window means;

f. means for transferring a heat transfer fluid through said space; and

g. a flange structure for mounting said tube on an external support, said structural means and said flange structure comprising a unitary element.

4,034,252

CERAMIC LAMP SEAL AND CONTROL OF SEALING FRIT DISTRIBUTION

Charles I. McVey, Shaker Heights, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 15, 1975, Ser. No. 640,804

Int. Cl.² H01J *17/04, 17/16*

U.S. Cl. 313—217 **6 Claims**

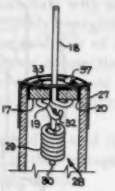
1. A high pressure vapor discharge lamp comprising:

a tubular light-transmitting ceramic envelope having an end closures and thermionic electrodes sealed into its ends and containing an ionizable filling;

a closure assembly at one end of said envelope comprising a ceramic plug having a perforation and a ceramic-match-

ing metal inlead conductor sealed therethrough, said plug being sealed to said envelope and said inlead being sealed to said plug by sealing frit;

and a crosspiece attached to said inlead immediately next to



the plug and extending transversely across the end of said envelope, and a ridge of sealing frit on the surface of said plug reaching up to said crosspiece and extending from the inlead-plug seal at the perforation to the plug-envelope seal on each side.

4,034,253

GLASS COVER PLATE FOR A FLAT DISPLAY PANEL HAVING MARGINAL PROJECTIONS

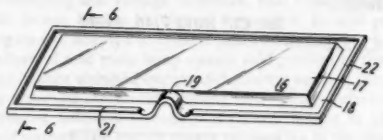
Takashi Yamauchi, Tokyo, Japan, assignor to Yamato Denshi Co., Ltd., Tokyo and Nippon Electric Kagoshima, Limited, Izumi, both of, Japan

Filed Mar. 25, 1976, Ser. No. 670,532

Claims priority, application Japan, Mar. 26, 1975, 50-40259

Int. Cl.² H01J *19/54, 61/30*

U.S. Cl. 313—317 **18 Claims**



1. In a glass cover plate for a flat display panel comprising a substantially planar substrate made of an electrically insulating material and having a plurality of electrodes attached thereto, said cover plate being of a shape of a substantial rectangle in outline and comprising an outwardly protruding central portion for covering said electrodes and a peripheral flange having a substantially planar surface to be sealed to said planar substrate, the improvement wherein said cover plate is provided with a projection along margins of said flange at least at each corner portion of said rectangle, said projection protruding away from said planar surface substantially in the direction in which said central portion protrudes.

4,034,254

COLOR TUBE HAVING CONCENTRIC PHOSPHOR RING PATTERN AND ELECTRON MULTIPLIER CHANNEL PLATE

Hewson Nicholas Graham King, Redhill; John Revere Mansell, East Grinstead, and Pamela May Stubberfield, Wantage, all of England, assignors to U.S. Philips Corporation, New York, N.Y.

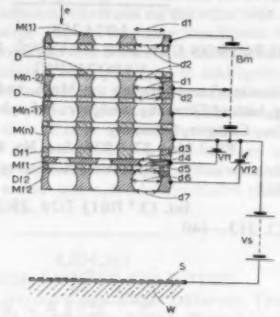
Filed Apr. 24, 1975, Ser. No. 571,402

Claims priority, application United Kingdom, May 7, 1974, 20020/74

Int. Cl.³ H01J *43/24, 43/22*

U.S. Cl. 313—400 **4 Claims**

1. A color cathode ray tube comprising an electron gun to generate an input electron beam, an electron multiplying, dynode channel plate structure having an input face opposite said gun and an output face emitting the outgoing electrons in hollow beams, a viewing screen arranged parallel to said output face; a focusing control electrode between said structure and said screen which electrode has apertures aligned with the channels of said structure and is provided to vary the overall width of said outgoing beams when varying focus potentials are applied thereto; said screen including an array of phosphor patterns arranged in concentric areas having different color responses to electron bombardment and each of said patterns being aligned with an aperture of the focusing control electrode in such manner that said varying focusing potentials can



control the outgoing electron beams so as to cause them to land on differing selected areas of said patterns; and an additional focusing electrode provided between the final dynode of the channel plate structure and said focusing control electrode, said additional electrode being thinner than said focusing control electrode and said additional electrode having apertures aligned with and smaller in cross-section than the channels of said structure to apply a degree of a constant focusing action to the hollow beams of individual channels while control of the diameter of said outgoing beams is performed by said focusing control electrode.

4,034,255

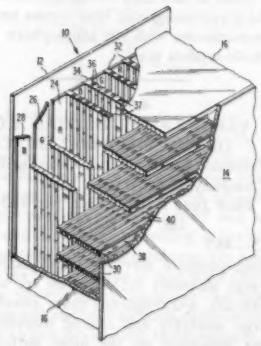
VANE STRUCTURE FOR A FLAT IMAGE DISPLAY DEVICE

Carmen Anthony Catanese, Rocky Hill; John Guiry Endriz, Plainsboro, and Jan Aleksander Rajchman, Princeton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 28, 1975, Ser. No. 636,095

Int. Cl.² G01J *31/48;* **H01J** *43/20, 29/70*

U.S. Cl. 313—400 **10 Claims**



1. A structure for an image display device comprising, an evacuated envelope including a transparent front panel

and a back panel spaced from said front panel, said front panel having a cathodoluminescent screen thereon,

a plurality of first vanes substantially perpendicular to and contacting said back panel, said first vanes being spaced from and parallel to each other,

a plurality of second vanes, substantially perpendicular to and contacting said front panel, said second vanes being spaced from and parallel to each other and transverse to said first vanes, said first and second vanes being mutually supporting, and

said first and second vanes having electroding thereon for controlling operation of said device.

4,034,256

ELECTRON GUN FOR HEATING, FUSING AND VAPORIZING

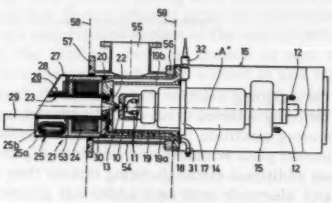
Peter Sommerkamp, Hanau am Main, and Walter Heil, Neuberg, both of Germany, assignors to Leybold-Heraeus GmbH & Co., Cologne, Germany

Filed May 27, 1976, Ser. No. 691,041

Claims priority, application Germany, June 24, 1975, 2528032

Int. Cl.² H01J *7/24, 29/76*

U.S. Cl. 313—440 **3 Claims**



1. Electron gun for heating, fusing and vaporizing having a high voltage portion, electron emitting cathode means, at least one beam forming electrode means associated with the cathode means, accelerating anode means, beam guiding tube means extending in the direction of the beam path and surrounded by jacket tube means, electromagnetic lens means and one or more deflection systems positioned in the space formed between the beam guiding tube means and the jacket tube means, said beam guiding tube means, jacket tube means, electromagnetic lens means and the deflection systems being contained in a single, replaceable unit which is joined by a plurality of hollow post means parallel to the gun axis of the high voltage portion of the gun and disposed between two flange ring means having distribution passages for coolant disposed therein one of which is connected to said replaceable unit and the other to said high voltage portion and wherein the space for the electromagnetic lens means and the deflection systems communicates with the atmosphere through at least one of the hollow posts means.

4,034,257

MERCURY VAPOR LAMP UTILIZING A COMBINATION OF PHOSPHOR MATERIALS

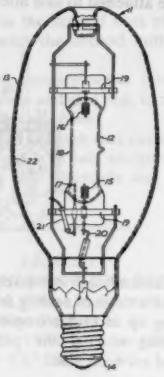
Mary V. Hoffman, South Euclid, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed June 5, 1975, Ser. No. 583,959

Int. Cl.² H01J *1/62*

U.S. Cl. 313—487 **16 Claims**

1. In a high-pressure mercury vapor lamp comprising an inner discharge assembly including an arc tube containing a filling of mercury, a transparent outer envelope surrounding said discharge assembly and spaced therefrom, and a phosphor coating deposited on the inner surface of said outer envelope, the improvement which comprises using a phosphor blend of a red-emitting phosphor selected from the group consisting of europium-activated yttrium vanadate and europium-activated yttrium vanadate phosphate with up to about 30 weight percent in said phosphor blend of cerium-



activated yttrium aluminate phosphor so as to absorb at least part of the 436 nanometer emission generated by the mercury arc discharge.

4,034,258

DEVICE FOR ATTENUATING VERY SHORT PARASITIC WAVES IN ELECTRONIC TUBES

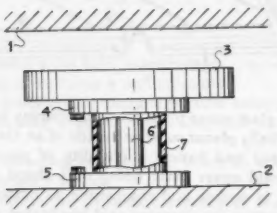
Georges Mourier, Paris, France, assignor to Thomson-CSF, Paris Cedex, France

Filed June 24, 1975, Ser. No. 589,888

Claims priority, application France, June 28, 1974, 74.22688

Int. Cl.² H01J *7/46, 19/80*

U.S. Cl. 315—39 **9 Claims**



1. A device for attenuating very short parasitic waves occurring between two conductive walls of a high frequency electronic tube, comprising a resistive element connected between two conducting components, one of said two conducting components being connected to one of said two conductive walls and the other of said conducting components is located opposite the other of said conductive walls spaced therefrom and forms a capacitor in association therewith, said attenuator device being disposed between said two conductive walls in a region of said tube devoided of useful waves.

4,034,259

SPARE LAMP CONTROL CIRCUIT FOR A LIGHT PROJECTION SYSTEM

David K. Schoch, Downers Grove, Ill., assignor to Audio Visual Innovators Corporation, Darien, Ill.

Filed Apr. 14, 1976, Ser. No. 676,747

Int. Cl.² H05B *37/04*

U.S. Cl. 315—93 **9 Claims**

1. A control circuit for a light projection system for operation from an alternating-current voltage source, said circuit comprising:

a pair of input lines for applying said alternating current voltage source to said circuit;

a main lamp;

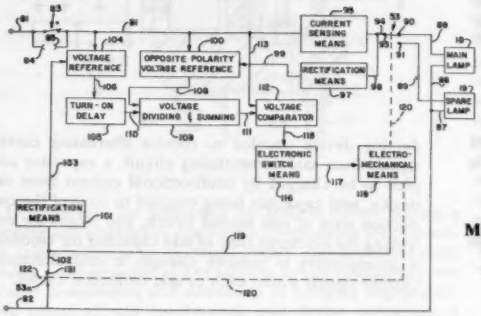
a spare lamp substantially in parallel connection with said main lamp;

switch means in series connection with said main lamp and said spare lamp for selectively energizing said main lamp or said spare lamp across said pair of input lines;

current sensing means in series connection with said switch means for sensing current through said main lamp and for dropping a portion of the voltage source thereacross;

rectification means;

a voltage reference established by said rectification means rectifying said portion of the voltage source dropped across said current sensing means;



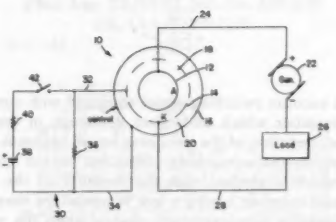
voltage comparator means for comparing the voltage difference between a pair of inputs, one of said inputs referenced to one of said input lines, another of said inputs for monitoring said voltage reference, said voltage comparator means having an output responsive to said pair of inputs and adapted to control said switch means, whereby failure of said main lamp causes said portion of the voltage source dropped across said current sensing means to be removed therefrom, causing said voltage reference to collapse and said voltage comparator means to change said output, said switch means responding to the changed output to said voltage comparator means to energize said spare lamp.

4,034,260

GRIDDED CROSSED-FIELD TUBE AND IGNITION METHOD

Michael A. Lutz, Livermore, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 19, 1976, Ser. No. 659,604
Int. Cl.² H01J *17/14, 17/32*
U.S. Cl. 315—344 **8 Claims**



1. A crossed-field switch device comprising:

a tubular anode electrode and a tubular cathode electrode spaced from said anode electrode, said electrodes having active areas that face to form a continuous closed main discharge gap therebetween and means for making electrical connections to said anode and said cathode electrodes and means for providing a gas at sub-atmospheric pressure in said main discharge gap and a magnetic field above the critical value in said main discharge gap so that a glow mode plasma discharge can take place between said anode and said cathode electrodes for conduction of said switch device, the improvement comprising:

a tubular control electrode postioned adjacent to one of said anode and cathode electrodes to form a continuous closed ignition discharge gap adjacent to, over the whole area of and in communication with said main discharge gap; and

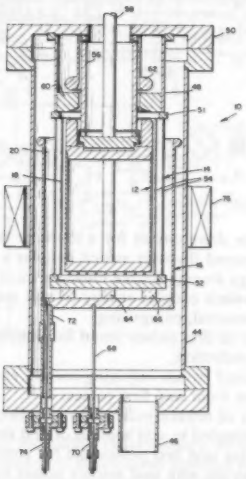
means for electrically pulsing said control electrode with respect to its adjacent electrode on the other side of said ignition discharge gap for bringing conditions in said ignition discharge gap into conductive conditions so that glow mode plasma discharge begins in said ignition discharge gap and enters into the entire area of said main discharge gap to cause conductive condition of said main discharge gap over all of its area so that said crossed-field switch device can be turned on with voltage applied thereto without magnetic field pulsing and with uniform wear of said anode and cathode electrodes over their entire active areas.

4,034,261

GRIDDED CROSSED-FIELD TUBE

Michael A. Lutz, Livermore, and Robin J. Harvey, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 19, 1976, Ser. No. 659,605
Int. Cl.² H01J *17/14, 17/32*
U.S. Cl. 315—344 **11 Claims**



1. A crossed-field switch device comprising:

a tubular anode electrode and a tubular cathode electrode spaced from said anode electrode the active areas thereof defining and facing a main discharge gap having therebetween a continuous closed path and means for making electrical connections to said anode and said cathode electrodes and means for providing a gas at sub-atmospheric pressure in said main discharge gap and a magnetic field above the critical value in said main discharge gap so that a glow mode plasma discharge can take place between said anode and said cathode electrodes for conduction of said switch device, the improvement comprising:

a tubular control electrode positioned adjacent to one of said anode and cathode electrodes to form a continuous closed path ignition discharge gap adjacent to, substantially over the whole active area of and in communication

with said main discharge gap, the electrode between said main gap and said ignition discharge gap being an intermediate electrode, said intermediate electrode having openings therethrough so that there is a line of sight between said main gap and said ignition gap so that plasma can pass from said ignition gap to said main gap; and

means for electrically pulsing said control electrode with respect to its adjacent electrode on the other side of said ignition discharge gap for bringing conditions in said ignition discharge gap into conductive conditions so that glow mode plasma discharge begins in said ignition discharge gap and enters into substantially the entire active area of said main discharge gap through said intermediate electrode to cause conductive condition of said main discharge gap so that said crossed-field switch device can be turned on with voltage applied thereto without magnetic field pulsing and with uniform wear of said anode and cathode electrodes over their entire active areas.

4,034,262

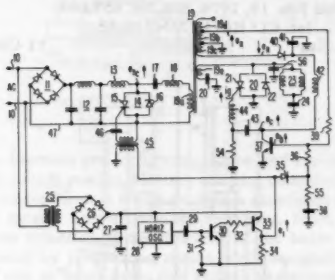
GATE DRIVE CIRCUIT FOR SCR DEFLECTION SYSTEM

Wolfgang Friedrich Wilhelm Dietz, New Hope, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,848

Int. Cl.² H01J *29/70, 29/76*

U.S. Cl. 315—408 **4 Claims**



1. A gate drive circuit for a thyristor deflection system in which a second thyristor switch couples a deflection winding to an energy storage source during a trace interval and a first thyristor switch couples energy to said source during a commutating interval, comprising:

a source of first pulses timed for enabling said first switch for conduction;

said second switch requiring second enabling pulses offset in time from said first pulses;

a source of retrace pulses in said deflection system;

means coupled to said sources of first and retrace pulses for delaying said first pulses and for combining said delayed first pulses with said retrace pulses for forming said second pulses; and

means coupling said second pulses to said second switch for enabling conduction thereof.

4,034,263

GATE DRIVE CIRCUIT FOR THYRISTOR DEFLECTION SYSTEM

Wolfgang Friedrich Wilhelm Dietz, New Hope, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 12, 1975, Ser. No. 612,733

Int. Cl.² H01J *29/70, 29/76*

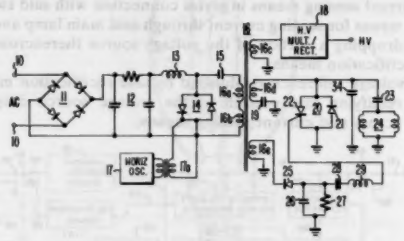
U.S. Cl. 315—408 **8 Claims**

1. A gat drive circuit for a thyristor deflection system, comprising:

a commutating circuit including a periodically controlled first switch for producing alternating current in said commutating circuit;

a trace circuit including a periodically controlled second switch coupled to said commutating circuit for storing energy in a deflection winding during a retrace interval of every deflection cycle; and

a gate drive circuit including a unidirectional current con-



ducting device coupled to receive alternating current signals from said commutating circuit, a capacitor coupled to be charged by unidirectional current from said device, said capacitor being coupled to control the conduction state of said second switch, and means for controlling the discharge time of said capacitor for rendering it unresponsive to polarity changes in said alternating current signals within each of said deflection cycles.

4,034,264

ARRANGEMENT FOR DETECTING A DEFICIENT OPERATIONAL CAPABILITY OF A VACUUM SWITCHING VESSEL

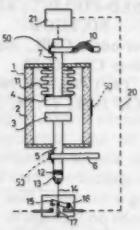
Kurt Muller; Hans-Jurgen Lendt, and Manfred Rimmrott, all of Berlin, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 2, 1975, Ser. No. 564,377

Claims priority, application Germany, Apr. 2, 1974, 2416318

Int. Cl.² H02H *7/22*

U.S. Cl. 361—2 **8 Claims**



1. In a vacuum switching vessel equipped with contacts and with a member which undergoes a change in temperature when the operation of the switching vessel becomes deficient, the improvement comprising: detection means mounted in heat-conductive contact with the member of the switching vessel, said member having a low temperature time constant and undergoing a temperature change when the vacuum in said vessel is insufficient to extinguish the arc between said contacts when opened, and said detection means having a physical characteristic changeable in response to a limited change in temperature; interrupting means for interrupting the flow of current through the vacuum switching vessel; and, transducer means for translating said change in physical characteristic into a signal for actuating said interrupting means

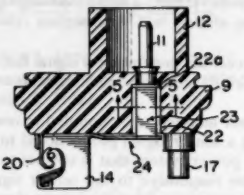
whereby the current through the vacuum switching vessel is interrupted.

4,034,265

ELECTRIC MOTOR PROTECTOR

Gideon A. DuRocher, and Daniel J. DuRocher, both of Mount Clemens, Mich., assignors to Essex International, Inc., Fort Wayne, Ind.

Continuation-in-part of Ser. No. 371,247, June 18, 1973, abandoned. This application Feb. 24, 1975, Ser. No. 552,171
Int. Cl.² H02H 7/085, 3/08
U.S. Cl. 361—25 12 Claims



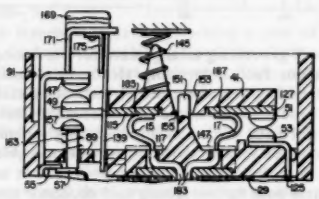
1. Apparatus for protecting an electric motor having a winding and electrically conductive components for connecting said winding in an electrical circuit, said apparatus comprising a compressible and expansible device constituting one of said components and constantly in bridging engagement with others of said components, said device comprising a plurality of electrically conductive particles contained in a thermally sensitive, elastomeric, non-conductive material which is expansible and contractile in response to an increase and decrease, respectively, in its temperature; and resilient, thermally sensitive force applying means acting on said device and normally applying on the latter a compressive force of such magnitude as to effect engagement of said conductive particles with one another and establish a conductive path through said material, the force applied by said force applying means on said device varying inversely with the temperature of said force applying means, said force applying means being of such resilience as to yield in response to expansion of said material due to an increase in its temperature and in an amount sufficient to enable disengagement of said conductive particles and thereby break the conducitve path through said material.

4,034,266

ELECTRIC WALL RECEPTACLE WITH GROUND FAULT PROTECTION

Gopal J. Virani, Bridgeport, and John J. Misencik, Shelton, both of Conn., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 29, 1975, Ser. No. 609,135
Int. Cl.² H02H 3/28
U.S. Cl. 361—42 6 Claims



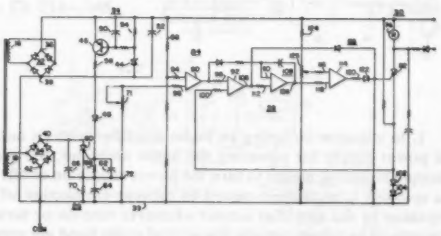
1. An electric receptacle for mounting in a wall outlet for connecting electrical appliances to the conductors of a power source, comprising an insulating housing adapted to fit in a wall outlet box, receptacle components and electronic components within the housing; the receptacle components comprising socket means for receiving the plug of an electrical appliance first and second pairs of contacts operable between open and closed positions for interruptably connecting the socket means to a power source, the stationary contacts of each pair of contacts being operatively mounted on the housing, a contact mounting arm carrying the movable contacts of each pair of contacts at spaced locations on the arm and aligned with the corresponding stationary contacts, a latch member releasably holding the contact arm in closed contact positions of said contacts, bias means for biasing the arm to a contact open position when the latch member is released and located between the movable contacts to effect pivotal movement of the arm upon the first pair of contacts during the initial pivotal movement when the latch member is released to effect opening of the second pair of contacts, a pivot point for the arm between the first pair of contacts and the bias means for final pivotal movement of the arm to effect opening of the first pair of contacts subsequent to opening of the second pair of contacts, operating means for moving the contacts to their open position in response to a fault signal; the electronic components comprising ground fault responsive means for monitoring the flow of current in the conductors and delivering a fault signal to the operating means in response to a current imbalance in the conductors, and said responsive means comprising a toroidal coil through which the conductors extend.

4,034,267

INDICATING APPARATUS

John T. Wilson, Beaver, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 12, 1975, Ser. No. 640,301
Int. Cl.² H02H 3/28
U.S. Cl. 361—44 17 Claims



1. Apparatus for indicating the existence of a fault in a multi-conductor electrical distribution system wherein the fault may occur in any of a plurality of adjacent electric conductors comprising:

a closed loop core structure current transformer having a power output winding and a control output winding, providing a power output and a central output respectively, said closed loop core forming a window therebetween, said plurality of electric conductors extending throught said window and causing a current flow in said transformer only when a fault exists in at least one of said conductors;

control signal translation means connected to said transformer control output for translating said transformer control output into a control signal;

starting means connected to said power output and said control signal translation means for initiating operation of said control signal translation means, said starting means being driven by said power output and initiating opera-

tion of said control signal translation means only when said power output reaches a predetermined power magnitude;

means for indicating the existence of a fault connected to and driven by said power output, said fault indicating means including means for preventing the operation of said fault indicating means, said prevention means being responsive to said control signal such that said prevention means allow the operation of said fault indicating means only when said control signal activates said prevention means; and

transmission means connected to said control signal translation means and said prevention means for transmitting said control signal from said control signal translation means to said prevention means.

4,034,268

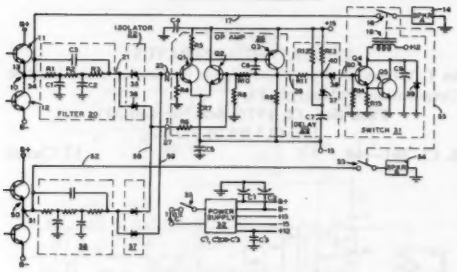
SPEAKER PROTECTION CIRCUIT

David E. Klauck, St. Joseph, Mich., assignor to Heath Company, Benton Harbor, Mich.

Filed Nov. 10, 1975, Ser. No. 630,598

Int. Cl.² H02H *3/00*

U.S. Cl. 361—111 **2 Claims**



1. In a system including an audio amplifier with an output, a power supply for powering the audio amplifier, the power supply including means to turn the power supply on or off, and a speaker, a protection circuit to prevent connection of the speaker to the amplifier output whenever turn-on or turn-off transients or signals outside the normal audio band are present at the amplifier output comprising, in combination:

a filter network connected to the amplifier output, said filter network being operative to block signals within the normal audio band and pass signals both above and below the normal audio frequency band;

an isolation circuit responsive to the signals passed by said filter network for separating the passed signals into a positive and a negative component;

detector means responsive to both said positive and said negative component for producing a control signal whenever the magnitude of either said positive or said negative component is below a given magnitude;

delay circuit means powered by the power supply for passing said control signal following a delay time after the power supply is turned on; and

a switching circuit powered by the power supply and responsive to said passed control signal from said delay circuit for connecting the speaker to the amplifier output, said switching circuit and power supply, in combination, being operative to disconnect the speaker from the amplifier output before turn off transients appear at the amplifier output when the power supply is turned off.

4,034,269

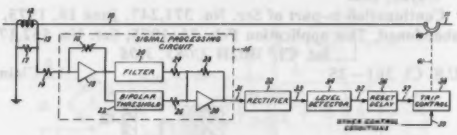
PROTECTIVE RELAY CIRCUITS

Stanley B. Wilkinson, Havertown, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Dec. 12, 1975, Ser. No. 640,308

Int. Cl.² H02H *7/00*

U.S. Cl. 361—79 **49 Claims**



1. A circuit for generating a signal for controlling the trip coil of a circuit breaker protecting an a-c power system comprising:

a. a sensor adapted to be coupled to one a-c power line for generating a sensor signal proportional to an electrical quantity in the power system that is subject to variations;

b. a filter responsive to the sensor signal for filtering the transient component from the sensor signal;

c. first circuit means responsive to the sensor signal for generating a signal having a first output level when the sensor signal is less than a predetermined level and having a second output level when the sensor signal exceeds said predetermined level, said second output level being a function of the sensor signal level;

d. second circuit means for combining the first generated signal and the filtered signal; and

e. third circuit means responsive to the combined signal for generating said trip coil control signal when the combined signal exceeds a fixed level.

4,034,270

SELF-INHIBITING SPARK GENERATING ARRANGEMENT

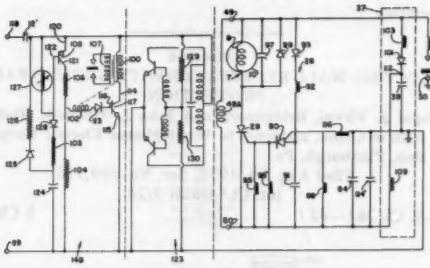
Russell B. Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Division of Ser. No. 422,692, Dec. 7, 1973, Pat. No. 3,938,937.

This application Apr. 7, 1975, Ser. No. 565,626

Int. Cl.² F23Q *3/00*

U.S. Cl. 361—256 **8 Claims**



1. A spark generating arrangement for producing sparks to ignite gaseous fuel, comprising electrode means, oscillator means operable when energized for activating said electrode means to produce sparks, said oscillator means having a feedback control path, timing means including resistance means and capacitance means, switching means operable when enabled to couple a source of direct current power to said feedback control path for energizing said oscillator means and to connect said resistance means and said capacitance means to said source of power to permit said capacitance means to charge over said switching means and said resistance means for a predetermined interval of time for causing said switching means to be maintained enabled during said time interval and

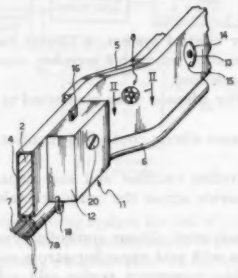
to be disabled when said capacitance means has charged to a given value whereby said switching means uncouples said source of power from said feedback control path of said oscillator means thereby deenergizing said oscillator means after said interval of time.

4,034,271

ELECTRICAL DISTRIBUTION SYSTEMS FOR MOTOR VEHICLES

Mario Palazzetti, Avigliana (Turin), and Franco Grisotto, Turin, both of Italy, assignors to Fiat Societa per Azioni, Turin, Italy

Filed Feb. 12, 1976, Ser. No. 657,553
Claims priority, application Italy, Feb. 27, 1975, 67492/75
Int. Cl.² H02B *1/04, 1/20*
U.S. Cl. 361—332 **5 Claims**



1. In a motor vehicle electrical distribution system of the type operating selectively to distribute electrical power to one or more electrical devices of the vehicle, and comprising:
an electric current conductor,
a control cable, and
a plurality of actuators operating to interconnect said electric current conductor and a selected one of said electrical devices or a selected group of said electrical devices in dependence on signals received along said control cable,
the improvement wherein:
said electric current conductor is in the form of a metal strip, and
said actuators are each directly mounted on said metal strip.

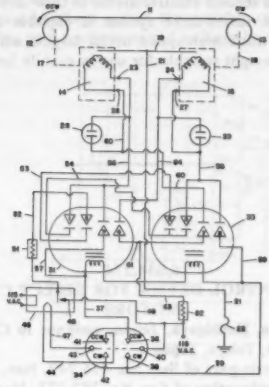
4,034,272

MOVING SCREEN ARRANGEMENT

John M. Steward, Grizzly Flat Road, Somerset, Calif. 95684

Filed July 7, 1975, Ser. No. 593,870
Int. Cl.³ B65H *77/00*
U.S. Cl. 318—7 **2 Claims**

1. A web transport system comprising a pair of reels for supporting, storing and displaying a web therebetween, a pair of reversible electric motors each operatively connected to one of said reels, relay means including a pair of relays for applying a first voltage to one of said motors to drive said one motor in a first rotational direction, and for applying a second, reduced voltage to the other of said motors to torque bias said other motor in said first rotational direction, and stopping means for applying a third, reduced voltage to said one motor to drive said one motor in said first direction while applying said first voltage in reverse fashion to said other motor to drive said other motor counter to said first direction and stop said reels, said stopping means including a manual switch and a time delay relay, said manual switch including a neutral, non-actuating position, a first position for actuating said relay means to apply said first and second voltages to said motors,



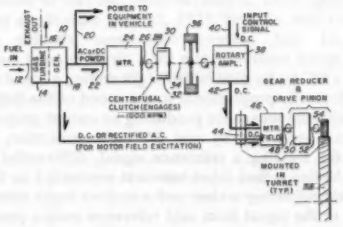
and a second position for actuating said time delay relay and said relay means to apply said third voltage to said motors.

4,034,273

TURBO-ELECTRIC TURRET DRIVE SYSTEM FOR MOBILE VEHICLES

James M. Meek, Silver Spring, and Benjamin E. Dunmore, Lanham, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 4, 1975, Ser. No. 546,973
Int. Cl.² B60K *41/02, 41/04*
U.S. Cl. 318—149 **13 Claims**



1. A turret-drive system for mobile vehicles comprising:
a rotary amplifier having a substantial overload factor;
a first electric motor connected to the driveshaft of a rotary amplifier for driving the rotary amplifier;
a flywheel mounted to the driveshaft for storing kinetic energy during normal rotation of the shaft;
means for impressing a control signal at the input of the rotary amplifier thus generating a related DC output;
a second electric motor having a substantial overload factor connected to the DC output for driving first gear means at a rate determined by the control signal, said first gear means being connected to a rotatable turret of a mobile vehicle;
second gear means relatively stationarily positioned for meshing engagement with said first gear means;
a turbo-generator having the generator output thereof connected to the first electric motor thereby energizing the latter;
said flywheel having a size such that rotation of the rotary-

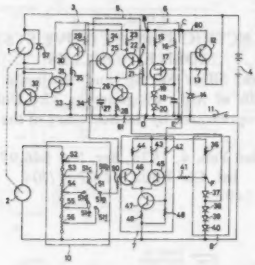
amplifier driveshaft remains fairly constant during momentary peak demands on the rotary amplifier, due to relatively limited energy transfer from the flywheel, the peak damands being met by operation of the rotary amplifier and second electric motor in their overload range; whereby the turret-drive system is capable of driving a turret to track high-speed aerial targets while having a size and weight suitable for use in mobile land vehicles.

4,034,274

SPEED CONTROL DEVICE FOR DIRECT CURRENT MOTORS

Hideaki Akima, Koshigaya, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 416,742, Nov. 19, 1973, which is a continuation of Ser. No. 257,272, May 26, 1972, abandoned. This application Aug. 1, 1974, Ser. No. 493,837
Claims priority, application Japan, May 28, 1971, 46-36802
Int. Cl.² H02P *5/16*
U.S. Cl. 318—334 **20 Claims**



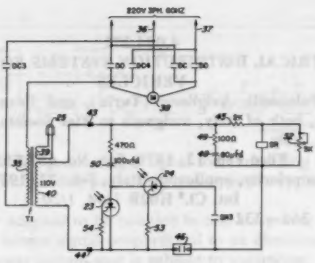
1. A speed control system for a direct current motor, comprising a DC tacho-generator for generating a speed indicating signal normally proportional to the speed of the motor, signal level adjusting means for producing an output proportional to the signal generated by said DC tacho-generator, reference means for forming a reference signal, differential amplifier means having a first input terminal connected to the output from said adjusting means and a second input terminal connected to the signal from said reference means producing an error signal that corresponds to a difference between the output of said adjusting means and the signal from said reference means, waveform-producing means for producing a varying signal of a predetermined wave shape, comparison means responsive to said waveform-producing means and the error signal from error signal-producing means for comparing the error signal with the wave shape of said waveform-producing means for producing pulses which last as long as the relationship between the wave shape and the error signal is in one range and outside another, switching means coupled to said comparison means and responsive to the pulses therefrom for producing driving pulses having pulse widths determined by said comparison means, the speed indicating signal departing from normal proportionality to the motor speed in response to changes in temperature, said reference means having a constant voltage circuit including a constant voltage circuit including series-connected diodes which departs from a constant value at a rate corresponding to the rate at which the speed indicating signal departs from proportionality to the motor speed.

4,034,275

OPTICAL CONTROL SYSTEM FOR ELEVATORS

Karl Mangel, 4709 B Church St., Skokie, Ill. 60076

Filed Dec. 29, 1975, Ser. No. 644,589
Int. Cl.² H02H *7/093*
U.S. Cl. 318—461 **6 Claims**



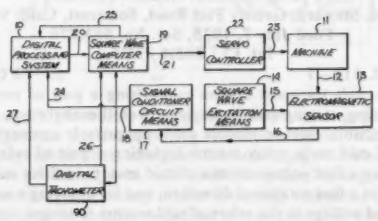
1. In an elevator control system, a circuit for sensing a reduction in the speed of a movable member, comprising
a relay having a solenoid,
a half-wave rectifier adapted to be connected to a source of A C voltage,
a first light activated silicon controlled rectifier,
a first capacitor,
said silicon controlled rectifier and said capacitor being connected in series across the output of said half-wave rectifier,
a second light activated silicon controlled rectifier connected in series with said capacitor across said solenoid,
a second capacitor connected across said solenoid, and means responsive to the speed of movement of said movable member for selectively and alternately applying light to said silicon controlled rectifiers at a rate proportional to the speed of said movable member,
whereby said relay is dropped out if said silicon controlled rectifiers are not sequentially activated at more than a predetermined rate.

4,034,276

DIGITAL SIGNAL PROCESSOR FOR SERVO VELOCITY CONTROL

Gilbert P. Hyatt, P.O. Box 4584, Anaheim, Calif. 92803

Division of Ser. No. 135,040, April 19, 1971, which is a continuation-in-part of Ser. No. 101,881, Dec. 28, 1970. This application Mar. 9, 1973, Ser. No. 339,817
Int. Cl.² G05B *1/02*
U.S. Cl. 318—608 **19 Claims**



1. A signal processing system comprising:
servo means for controlling a physical system, said servo means including feedback means for generating a feedback signal wherein said feedback signal is related to control of said physical system and
processor means for generating an output signal related to a

frequency of the feedback signal, said processor means including

a. detector means for generating a detector signal in response to a repetitive condition of the feedback signal;

b. reference means for generating a reference signal in response to the detector signal; and

c. output means for generating the output signal in response to the feedback signal and the reference signal.

4,034,277

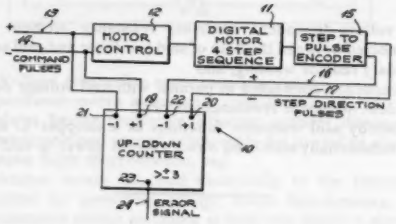
PULSE TO STEP ERROR SENSING CIRCUIT

Albert C. Leenhouts, Harwinton, Conn., assignor to The Superior Electric Company, Bristol, Conn.

Filed Aug. 13, 1975, Ser. No. 604,318

Int. Cl.² G05B *19/40*

U.S. Cl. 318—685 **6 Claims**



1. An error sensing system for use in a digital motor system that accepts command pulses and is to produce a step for each pulse comprising a digital motor of the type that is to produce a step for each change of energization with the changes occurring in a repeatable sequence with each sequence having the same set plural number and pattern of changes, means for changing the energization of the motor to produce a step for each command pulse received, means for sensing that the motor has produced a step, means for maintaining a count of the instantaneous difference between the number of command pulses and the number of steps and means for providing an error signal only when the count of the instantaneous difference has a value from which the motor is incapable of overcoming which is when the instantaneous count difference is greater than one less than the set number of changes in a sequence.

4,034,278

CHARGING CIRCUIT FOR A FLASH CAPACITOR

Egon Gahler, Hattersheim; Hans Eberhard Heintke, Wachtersbach, and Rolf Dietrich, Hofheim, all of Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Germany

Filed Oct. 2, 1975, Ser. No. 618,997

Claims priority, application Germany, Oct. 2, 1974, 2446960

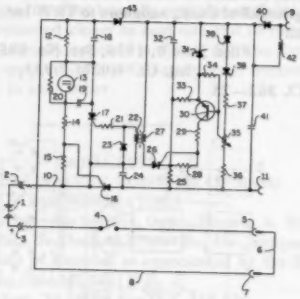
Int. Cl.² H02M *9/04*; G05F *3/14*

U.S. Cl. 320—1 **10 Claims**

1. A circuit for charging a flash capacitor from a DC voltage source which provides a voltage larger than that for which the flash capacitor is designed comprising:

a first thyristor having a control electrode electrically connected in series between the DC voltage source and the flash capacitor;

circuit means electrically connected to the flash capacitor and said control electrode of said first thyristor for monitoring the voltage of the flash capacitor and for providing a control signal through said control electrode of said first thyristor for rendering said thyristor non-conducting when the designed voltage of the flash capacitor is exceeded, said circuit means including means for maintaining said control electrode of said first thyristor at a voltage proportional to the voltage of the DC voltage source sufficient to render said first thyristor conductive before the designed voltage of the flash capacitor is reached, said circuit means also including a variable resistance means electrically connected in parallel to the flash capacitor for rendering said first thyristor non-conducting when a predetermined voltage across the variable resistance means develops, said predetermined voltage being proportional



to the voltage across the flash capacitor, said circuit means further including a transistor electrically connected between said variable resistance means and said first thyristor, said predetermined voltage rendering said transistor conductive; and

a Zener diode electrically connected to the emitter of said transistor for providing a reference voltage at the designated voltage of the flash capacitor.

4,034,279

METHOD AND A DEVICE FOR DETERMINING GAS GENERATION WITH ELECTRODES IN CONTACT WITH ELECTROLYTES

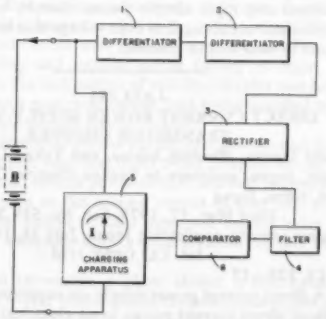
Bruno Yngve Nilsson, Boliden, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Continuation of Ser. No. 486,591, July 8, 1974, abandoned. This application Dec. 22, 1975, Ser. No. 643,162

Claims priority, application Sweden, July 13, 1973, 7309890

Int. Cl.² H02J *7/04*

U.S. Cl. 320—20 **2 Claims**



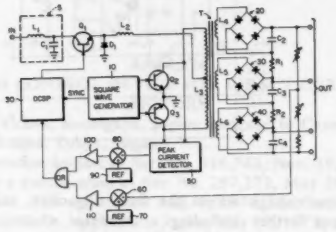
1. A method for controlling the charging condition of an electric accumulator, characterized by the steps of determining the resistance fluctuations at an electrolyte-electrode interface due to the gas generation by time differentiating the terminal voltage, rectifying and filtering the differentiated voltage to obtain a D.C. voltage, the level of which being a measure of the intensity of the gas generation process, sensing

said level and governing the value of the charging current in response to the sensed level.

4,034,280
MULTIPLE HIGH VOLTAGE OUTPUT DC-TO-DC POWER CONVERTER

Donald L. Cronin, Anaheim; Bertrand F. Farber, Hermosa Beach; Hartmut K. Gehm, and Daniel S. Goldin, both of Los Angeles, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed June 9, 1975, Ser. No. 585,429
Int. Cl.² H02M *3/335*
U.S. Cl. 363—25 **3 Claims**



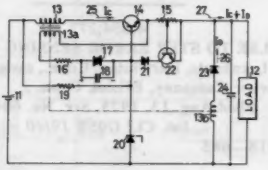
1. A DC to Dc power converter comprising:
a. a transformer having a primary winding and a plurality of secondary windings;
b. input circuit means coupled to said primary winding to cause an AC power to flow therethrough;
c. said input circuit means including means to accept DC power at a first voltage and transistor means to convert said DC power to AC power at a first relatively low voltage for transmission through said primary winding, said transformer being such that the alternating voltage on each of said secondary windings is higher than that at said primary winding;
d. output circuit means associated with each of said secondary windings to reconvert AC power induced in the associated secondary winding to DC power at a higher voltage;
e. a capacitor effectively directly connected across each of said secondary windings, the capacitance of each of said capacitors being reflected across said primary winding to provide an input current source; and
f. a peak current detector having an input coupled across said primary winding and having an output coupled across said input circuit means, thereby to protect said transistor means against over voltage due to a short in any one of said output circuits.

4,034,281
DIRECT CURRENT POWER SUPPLY WITH A TRANSISTOR CHOPPER

Kouichi Morita; Hirohito Sekine, and Takao Ubukata, all of Niiza, Japan, assignors to Sanken Electric Company Limited, Niiza, Japan

Filed Mar. 17, 1975, Ser. No. 559,216
Claims priority, application Japan, July 25, 1974, 49-85761
Int. Cl.² G05F *1/58*
U.S. Cl. 323—17 **1 Claim**

1. A direct current power supply for supplying substantially stabilized direct current power to an electrical load comprising, in combination:
a source of direct current having opposite polarity terminals across which said load is connected;
a transistor connected between said source and said load;
a reactor comprising:
a primary winding connected between said source and said load; and
a secondary winding magnetically coupled to said primary reactor winding and adapted to apply a biasing voltage across a base and emitter of said transistor;
energy release circuit means through which the electrical energy stored in said reactor is released;
starting circuit means connected to the base of said transistor for supplying a starting current thereto;
base control circuit means also connected to the base of said transistor for controlling a base current thereof; and

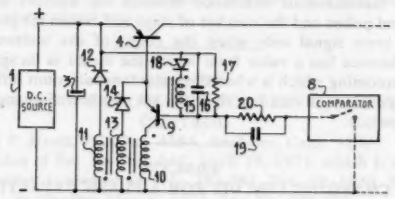


a voltage-dependent nonlinear resistance element connected between the base of said transistor and said secondary reactor winding; and
a capacitor connected in parallel with said voltage dependent nonlinear resistance element;
whereby said transistor functions as a chopper to supply substantially stabilized direct current power to said load.

4,034,282
CHOPPER-STABILIZED POWER SUPPLY

Yves Renard, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Oct. 20, 1975, Ser. No. 624,408
Claims priority, application France, Oct. 22, 1974, 74.35446
Int. Cl.² G05F *1/56*
U.S. Cl. 323—17 **4 Claims**

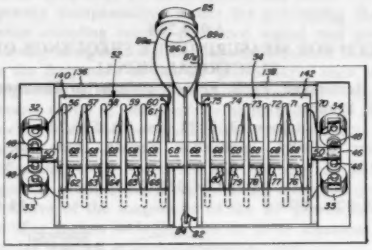


1. A chopper-stabilized power supply comprising a switching transistor and an integrating filter connected between a source of unstabilized d.c. energy and a load circuit, a voltage comparator for comparing the output voltage of the power supply to a reference voltage and for delivering rectangular signals of variable width and constant repetition frequency or constant width and variable repetition frequency, a control transistor connected by its base to said voltage comparator for furnishing a control current to the base of said switching transistor, the emitter-collector circuit of said control transistor being connected in series with an inductor which is connected to one terminal of said source and which is constituted by the primary winding of a transformer, said transformer including a secondary winding connected to said one terminal and in series with a diode to the base of said switching transistor for neutralizing the charge carriers present in the junction of said switching transistor at each cut-off of the current of the control transistor and said transformer further including an additional secondary winding connected to said one terminal and in series with a further diode to the base of said control transistor.

4,034,283
COMPENSATED VOLTAGE DIVIDER

Anthony Pellegrino, Brewster, N.Y., assignor to The Machlett Laboratories, Incorporated, Stamford, Conn.

Filed Aug. 28, 1975, Ser. No. 608,495
Int. Cl.² G01T 1/26
U.S. Cl. 323—74 10 Claims



1. Voltage monitoring apparatus comprising:

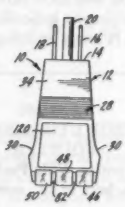
capacitance means including a coaxial array of capacitive plates having respective adjacent surfaces disposed in predetermined spaced relationship for providing electrostatic fields therebetween; and

resistance means attached electrically to the capacitive plates for providing voltage drops therebetween, the resistance means including at least one resistive element disposed entirely between respective adjacent surfaces of the capacitive plates and in direct electrical contact therewith.

4,034,284
HAND-HELD WALL RECEPTACLE WIRING TESTER WITH OPPOSITELY DISPOSED PUSH/PULL SURFACES FOR INSERTION AND REMOVAL OF THE TESTER

Marvin J. Peplow, and Peter M. Wells, Jr., both of Sycamore, Ill., assignors to Ideal Industries, Inc., Sycamore, Ill.

Filed Aug. 8, 1975, Ser. No. 603,036
Int. Cl.² G01R 31/02; H01R 13/62, 33/06
U.S. Cl. 324—51 6 Claims

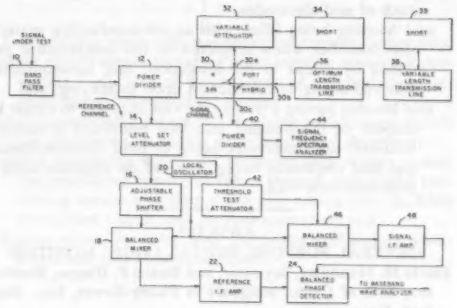


1. In a hand-held receptacle wiring tester, a housing, two generally parallel flat blades and a ground blade mounted within the housing and protruding from the wall at one end thereof in fixed positional relationship for insertion into a wall receptacle, said flat blades each having a first shoulder adapted to abut against said wall of the housing from within to prevent the blade from being pulled out of the housing, and a second shoulder spaced longitudinally from the first shoulder and adapted to abut against an internal retaining wall of the housing to prevent the blade from being pushed into the housing, a plurality of indicator lamps at the other end of the housing and contained within the housing, electrical connections between the lamps and the blades so that the lighting of the lamp and various combinations of lamps indicates respective predetermined wiring conditions of a wall receptacle into which the terminal blades are inserted, the housing having first laterally opposed surfaces on the exterior thereof which spread increasingly apart toward the said one end of the tester and second laterally opposed surfaces which spread increasingly apart toward the other end of the tester, thereby to provide bearing surfaces for respectively pushing the tester manually into a receptacle and pulling it out therefrom, each of the first and second surfaces comprising a pair of surfaces which are generally symmetrically situated with respect to a longitudinal center line through the housing, the first and second pairs of surfaces being on different sides of the housing and limited thereto, the first laterally opposed surfaces being longitudinally positioned closer to said one end of the tester than the second laterally opposed surfaces with the first and second laterally opposed surfaces being an axial nonoverlapping relationship to each other.

4,034,285
SUPERHETERODYNE NOISE MEASURING DISCRIMINATORS

James R. Ashley, Colorado Springs, Colo.; Thomas A. Barley, and Gustaf J. Rast, Jr., both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 30, 1976, Ser. No. 718,691
Int. Cl.² G01R 27/00
U.S. Cl. 324—57 R 7 Claims



1. A superheterodyne noise measuring discriminator for measuring input frequency modulation noise on a carrier signal comprising:

a bandpass filter having an input and an output, the input being disposed to receive said carrier with modulation noise signal;

a first and second power divider means, each having an input and first and second outputs, the input of said first power divider being coupled to the output of said filter to receive said carrier with modulation noise signal;

signal coupling and routing means having an input port coupled to the first output of said first divider and having a first output port; said output port being coupled to the input of said second power divider;

quadrature detection means having first and second inputs and an output, said first input being coupled to the first output of said second power divider and said second input being coupled to the second output of said first power divider, the output of said detection means being disposed for coupling output measurement signals therefrom;

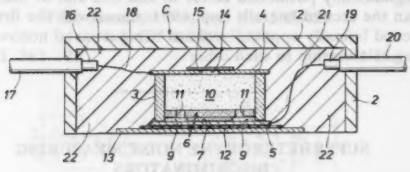
a signal level attenuator, a phase shifter, a first balanced mixer and a first intermediate frequency amplifier connected in series between the second output of said first divider and the second input of said quadrature detection means; and a threshold test attenuator, a second balanced mixer, and a second intermediate frequency amplifier connected in series between the first output of said first divider and the first input of said quadrature detection means, said threshold test attenuator providing means for determining and correcting for discriminator internal noise.

4,034,286

DEVICE FOR DETECTING A FAILURE IN AN INSULATION SYSTEM

Yaacov Lev, Liverpool, England, and Frederick R. Pritchard, Caergwrle, nr. Wrexham, Wales, assignors to Shell Internationale Research Maatschappij B.V., Netherlands

Filed Nov. 3, 1975, Ser. No. 628,059
Int. Cl.² G01N *27/00*
U.S. Cl. 324—71 R **4 Claims**



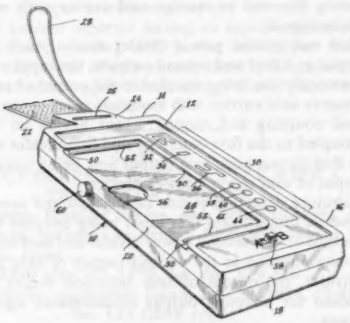
1. A sensing device for detecting a failure in an insulation system of cryogenic tank comprising:
a closed housing;
a pair of spaced electrodes mounted within said housing;
a pair of electrical leads, one of said leads being attached to each of said electrodes;
said housing being filled with an ion-conducting material that solidifies when subjected to the temperature produced by a leak in the insulation, said ion-conducting material changing conduction upon solidifying; and
said housing having a transverse wall disposed to divide the interior of the housing into two reservoirs of unequal volumes, said reservoirs being in fluid communication, and said electrodes being disposed on opposite sides of said transverse wall.

4,034,287

GENERAL PURPOSE DIGITAL LOGIC MONITOR

Flavio M. Manduley, Seymour, and Daniel F. Dlugos, Huntington, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Dec. 15, 1975, Ser. No. 640,487
Int. Cl.² G01R *15/12*; G11C *11/02*
U.S. Cl. 324—73 R **29 Claims**



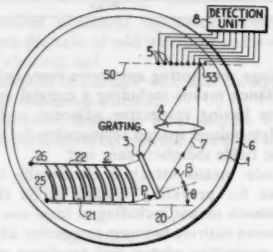
1. A general purpose electronic monitor for use in servicing digital logic circuits within a system having a clock, comprising
a display for providing a visual read-out of the status of a digital logic circuit;
connection means adapted to be connected to a selected digital logic circuit for carrying digital signals between the selected circuit and said display;
an auxiliary clock for permitting an operator to introduce clock pulses to the selected digital logic circuit to step the circuit through its operating sequence at an operator-selected rate as an alternative to having the circuit driven by the system clock; and
means for latching said display to permit an operator to freeze inputted signals on the display without interrupting continued digital logic circuit operation.

4,034,288

SYSTEM FOR MEASURING THE FREQUENCY OF AN ELECTRICAL SIGNAL

Pierre Hartemann, Paris, France, assignor to Thomson-CSF, Paris, France

Filed June 13, 1975, Ser. No. 586,750
Claims priority, application France, June 18, 1974, 74.21123
Int. Cl.² G01R *23/00*
U.S. Cl. 324—80 **11 Claims**



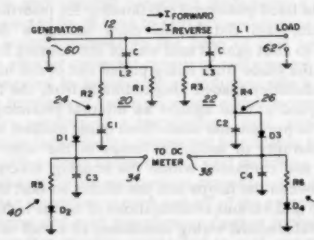
1. A system for measuring the frequency of an electrical signal, said system comprising: a substrate of piezo-electric material having a face for propagating vibratory energy in the form of surface elastic waves, and a transducer array of radiator elements positioned on said face for launching in response to said electrical signal a frequency steerable narrow beam of said vibratory energy; said narrow beam having in said face N distinctly orientated transmission paths respectively corresponding to N distinct values of said frequency; said system further comprising a set of N elementary detection means respectively located on said face along said N distinct transmission paths for supplying an indication relative to any one of said N distinct values; N being an integer at least equal to two.

4,034,289

RF POWER MONITOR UTILIZING BI-DIRECTIONAL COUPLER

Edward Francis Rozylowicz, Villa Park, and Steven Glen Twiselton, Lake Zurich, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 5, 1976, Ser. No. 646,456
Int. Cl.² G01R *21/04*; H01P *5/14*
U.S. Cl. 324—95 **12 Claims**



1. In a means for monitoring an RF power line and produc-

ing a signal representative of the power flow thereon, apparatus comprising:

reactance coupling means, electrically coupled to the power line in a low power loss configuration, and producing a signal whose magnitude is dependent on the magnitude of power flow on the power line, said reactance coupling means produced signal magnitude also being dependent on the frequency of the RF power line flow;

frequency compensating means for processing the reactance coupling means produced signal and predeterminedly compensating the magnitude thereof in response to the frequency of the RF power flow, such that the magnitude of the frequency compensating means processed signal is substantially independent of the frequency of the RF power line flow over a given frequency range,

rectifier means for rectifying and filtering the processed signal to produce a DC signal having a magnitude representative of the magnitude of the RF power flow, said rectifier means including one or more elements which display thermal drift characteristics; and

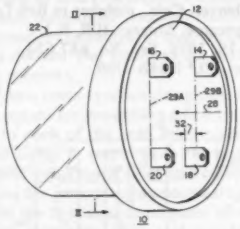
diode means for compensating said DC produced signal against thermal drift.

4,034,290

ELECTRICAL METER ASSEMBLY HAVING DISPLACED METER AND SOCKET TERMINALS

Robert A. Warren, deceased, late of Raleigh, N.C. (by Dorothy L. Warren, executrix), assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 28, 1976, Ser. No. 653,046
Int. Cl.² G01R 11/24, 1/04; H01R 13/64
U.S. Cl. 324—110 6 Claims



1. An electric meter assembly, comprising:

a meter socket including plural line and load terminals disposed on symmetrical terminal axes thereof such that said load terminals are aligned with said line terminals along common symmetrical axes which are parallel;

a meter including plural terminals for plug-in attachment to said meter socket terminals, said meter terminals being disposed relative to symmetrical terminal axes thereof such that one of the meter terminals is offset from one of the meter terminal axes, and said meter terminal axes being alignable with the socket terminal axes so that the one meter terminal is offset from one of the socket terminals when said meter is positioned for mounting in said meter socket; and

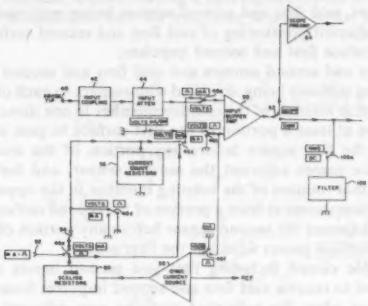
an electrically conductive terminal adaptor including a first portion attachable to said one socket terminal wherein said first portion has a blocking part for preventing insertion of a meter terminal into said one socket terminal, and said adaptor further including a second portion defining an auxiliary socket terminal being offset from said one socket terminal so that said one socket terminal is modified for mounting said meter in said meter socket in only one predetermined orientation.

4,034,291

ELECTRONIC MEASURING INSTRUMENT COMBINING AN OSCILLOSCOPE AND A DIGITAL MULTIMETER

David William Allen, Beaverton, and Marshall Bond Borchert, Aloha, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 14, 1975, Ser. No. 567,798
Int. Cl.² G01R 13/20, 15/08
U.S. Cl. 324—121 R 8 Claims



1. A portable electronic measuring instrument, comprising:

input circuit means including preprocessing means for converting a plurality of input signals of different measurement quantities to voltage signals;

analog processing means for receiving said voltage signals and producing an analog waveform signal therefrom;

digital processing means for receiving said voltage signals and producing numerical values thereof, said digital processing means including a Gm conversion unit, an RMS conversion circuit, and an A-D converter; and

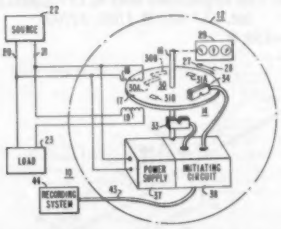
display means for selectively displaying said analog waveforms and said numerical values.

4,034,292

DIRECTION SENSITIVE OPTO-ELECTRONIC PULSE INITIATOR FOR ELECTRICAL METERS

Theodore M. McClelland, III, Raleigh, N.C., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 18, 1976, Ser. No. 658,951
Int. Cl.² G01R 11/36, 13/38; G01D 5/36; G08C 19/16
U.S. Cl. 324—157 6 Claims



1. A direction sensitive pulse initiator for an electrical meter having an electro-responsive meter movement including a rotating member which rotates in opposite directions and at a rate corresponding to the direction and amount of an electric power quantity to be measured by the electrical meter, said pulse initiator comprising:

a light reflecting pattern including first and second circularly arcuate surfaces disposed on the rotating member, said first of the reflecting surfaces extending along a first circular axis between first and second ends thereof, and

said second of the reflecting surfaces extending along a second circular axis between first and second ends which are arcuately staggered relative to said first and second ends of said first surface and being positioned along a second arc, said second circular axis being concentric with said firstcircular axis and having a radius which is greater than the radius of the first circular axis;

first and second optical sensors mounted on said meter in alignment with said first and second circular axes, respectively, so as to separately detect the respective first and second reflecting surfaces when positioned adjacent the sensors, said first and second sensors being activated by the adjacent positioning of said first and second surfaces to produce first and second impulses;

said first and second sensors and said first and second relfecting surfaces being arranged with respect to each other such that rotation of the rotating member in one direction causes at least a portion of the first surface to pass adjacent the first sensor before any portion of the second surface passes adjacent the second sensor, and further such that rotation of the rotating member in the opposite direction causes at least a portion of the second surface to pass adjacent the second sensor before any portion of the first surface passes adjacent the first sensor;

a bistable circuit including first and second inputs connected to receive said first and second impulses from the sensors when the reflecting surfaces pass adjacent the sensors, said circuit being connected to establish opposite output states corresponding to said one and opposite directions of rotation and maintaining the associated output state when the direction of rotation remains the same; and

output circuit means for producing output pulses at a rate corresponding to the rate of rotation of said rotating member, said output circuit means including an input connected to the bistable circuit so as to be responsive to the opposite output states, and further including first and second output channels selectively producing said output pulses in accordance with the opposite states of said bistable circuit, said first output channel providing the output pulses corresponding to the power quantity when occurring in one direction, and said second channel providing the output pulses corresponding to the power quantity when occurring in the opposite direction.

4,034,293

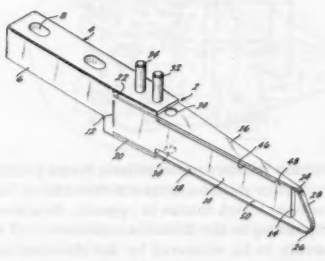
MICRO-CIRCUIT TEST PROBE

Jacques Leon Roch, San Jose, Calif., assignor to Electroglas, Inc., Santa Clara, Calif.

Continuation of Ser. No. 447,865, March 4, 1974, which is a continuation-in-part of Ser. No. 436,844, Jan. 28, 1974, Pat. No. 3,939,414. This application May 8, 1975, Ser. No. 575,970

Int. Cl.² G01R *1/06, 31/02*

U.S. Cl. 324—158 P **19 Claims**



1. A probe for testing integrated micro-circuits comprising:

a dielectric support body;

conductive spring arms supported by said body;

said arms including a longer arm and a shorter arm;

said shorter arm being positioned above said longer arm and in spaced relation to said longer arm;

said arms each having outer ends;

a conductive probe tip connected to said outer ends and said probe tip including a downwardly positioned point for contact with a surface having an integrated circuit defined thereon;

contact means cooperating with said arms and said tip to transmit an electrical signal to or from said tip;

each of said arms having inner ends joined directly to said body with said arms having a substantial length to width ratio to permit said arms to bend with respect to said support body during upward movement of said probe tip with said point in contact with a surface having an integrated circuit defined thereon;

the outer ends of said shorter arm and said longer arm each undergoing movement in separate arcuate paths when said arms are bent as said probe tip is moved upwardly, and

the outer end of said shorter arm undergoing an inward horizontal movement which is greater than the inward horizontal movement of said longer arm during bending of said arms with upward movement of said probe tip,

whereby the angle of said probe tip is decreased with respect to the surface having an integrated circuit defined thereon during upward movement of said probe tip to provide an outward horizontal movement to said point which tends to compensate for inward horizontal movement of said tip so as to prevent arcing of a surface contacted by said point by maintaining the position of said point relatively constant with respect to the surface contacted by the point.

4,034,294

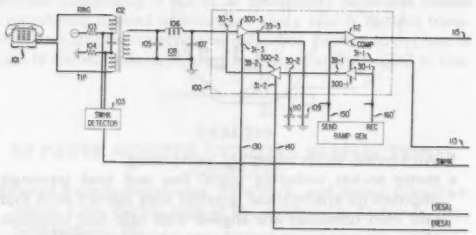
OVERLAP PCM CODER/DECODER WITH REACTION TIME COMPENSATION

James Edwin Dalley, Denver, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 19, 1976, Ser. No. 687,624

Int. Cl.² H04B *1/00*

U.S. Cl. 325—38 R **11 Claims**



1. An arrangement for compensating both

a. for the time between the time of attainment of a predetermined count by a counter commencing to count clock pulses at an initial count determined by a received binary code pattern and the time a ramp signal is decoupled from a first analog signal storage device, and

b. for the time between the time said ramp signal equals the amplitude of a signal on a second analog signal storage device and the time said counter is disconnected from said clock pulses, comprising:

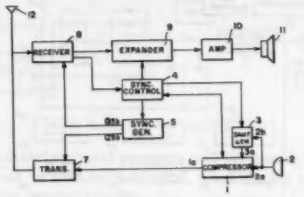
means defining a sequence of successive field intervals during a first of which said ramp signal is connected and disconnected from said second analog signal storage device and during the second of which said clock pulses are coupled and decoupled from said counter; and

means operative intermediate successive ones of said field intervals for augmenting by a predetermined amount, the count corresponding to said received code pattern.

4,034,295
RADIO COMMUNICATION SYSTEM FOR SIMULTANEOUS TELECOMMUNICATION BETWEEN RADIO STATIONS

Katsutaka Kotezawa; Toshimi Onodera; Setsuo Hayashi, and Fujio Shimanuki, all of Funabashi, Japan, assignors to Chiba Communications Industries, Inc., Funabashi, Japan

Filed Jan. 28, 1976, Ser. No. 653,249
Claims priority, application Japan, Feb. 5, 1975, 50-14378; Feb. 12, 1975, 50-16811
Int. Cl.² H04B 1/00
U.S. Cl. 325—39 **4 Claims**



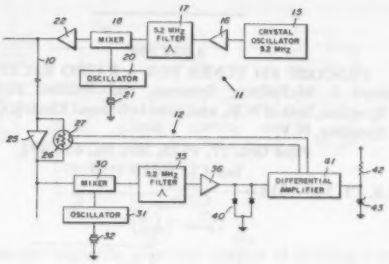
1. A radio communication system for simultaneous telecommunication betweeen a calling station and a called station comprising:
   a transmitter;
   a receiver;
   a sampling pulse generator for generating sampling pulses for dividing an aural signal at a suitable time division rate;
   a compressor for suitably compressing said sampled aural signal with respect to the time axis including memory means in which said sampled aural signal is written to be read out at a reading speed higher than the writing speed;
   a synchronizing signal generator for generating a synchronizing signal synchronous with said aural signal compressed by said compressor for alternately turning on and off said transmitter and said receiver;
   an expander connected to said receiver for expanding the time-divided and compressed aural signals received by said receiver,
   and a zero cross synchronizing circuit comprising first circuit means for generating a first trigger pulse corresponding to each of the zero cross points of said compressed aural signal in response to the application of said compressed aural signal from said compressor, second circuit means for generating a second trigger pulse corresponding to the first zero cross point of said compressed aural signal appearing after said synchronizing signal, third circuit means for generating a third trigger pulse corresponding to the zero cross point of said compressed aural signal appearing immediately before the inversion of said synchronizing signal, and fourth circuit means for applying to said transmitter the aural signal portion appearing between the time at which said second trigger pulse generated by said second circuit means is applied thereto and the time at which said third trigger pulse generated by said third circuit means is applied thereto.

4,034,296
OMNI-FREQUENCY PILOT SYSTEM

Walter Louis Berenson, Palatine, and Ronald Wayne Taylor, Arlington Heights, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 644,797
Int. Cl.² H04B 1/62
U.S. Cl. 325—62 **5 Claims**

1. Omni-frequency pilot means for use in a suppressed carrier communications system including a communications link, said pilot means comprising:
   a. a pilot signal generator including first crystal controlled oscillator means having an output, a second crystal controlled oscillator with a plug-in crystal and an output, a mixer having a first input connected to the output of said first crystal controlled oscillator means, a second input connected to the output of said second crystal controlled oscillator and an output, and level control means connected between the output of said mixer and the communications link for controlling the level of the pilot applied to the communications link; and
   b. a pilot signal receiver including variable gain amplifier means connected into the communications link and having a regulating input for receiving a regulating signal thereon, a mixer having a first input coupled to the communications link for receiving a pilot signal from said

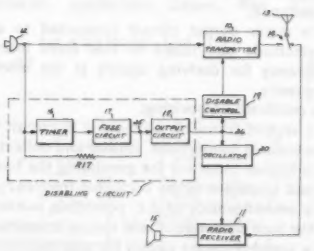


pilot generator and further having a second input and an output, a crystal controlled oscillator having a plug-in crystal connected thereto for controlling the frequency thereof and further having an output connected to the second input of said receiver mixer, a bandpass filter tuned to pass a predetermined frequency, said filter being coupled between the output of said receiver mixer and the regulating input of said variable gain amplifier means, and the plug-in crystal of said receiver oscillator controlling the frequency thereof to convert the frequency of the received pilot signal in said receiver mixer to the predetermined frequency of said bandpass filter.

4,034,297
CIRCUIT FOR DISABLING A RADIO TRANSMITTER WHICH IS CONTINUOUSLY OPERATED LONGER THAN A PREDETERMINED TIME

Robert A. Giorgi, and James E. Loyd, III, both of Lynchburg, Va., assignors to General Electric Company, Lynchburg, Va.

Filed Jan. 13, 1976, Ser. No. 648,788
Int. Cl.² H04B 1/04
U.S. Cl. 325—166 **9 Claims**



1. An arrangement for preventing a person from keying a radio transmitter for more than a predetermined continuous time period by operation of a microphone, said arrangement comprising:
   a. an input circuit for receiving a signal indicative of the operation of said microphone for said radio transmitter;

b. a timing circuit connected to said input circuit for producing a timing signal in response to said microphone operation signal exceeding a predetermined continuous time period;

c. a fuse circuit connected to said timing circuit for blowing a fuse in response to said timing signal;

d. an output circuit connected to said fuse circuit and to said input circuit for producing an output signal in response to said fuse being blown and in response to said microphone operation signal;

e. and means for connecting said output circuit to said radio transmitter for preventing operation of said radio transmitter in response to said output signal.

4,034,298

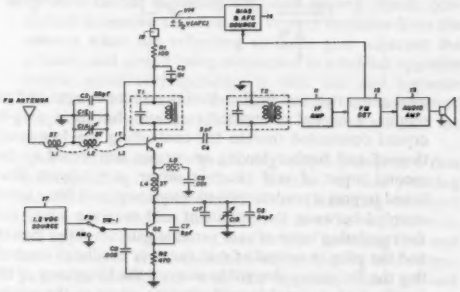
CASCODE FM TUNER FOR A RADIO RECEIVER

Robert J. McFadyen, Syracuse, and William Peil, North Syracuse, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Oct. 17, 1975, Ser. No. 623,372

Int. Cl.² H04B 1/16

U.S. Cl. 325—318 **9 Claims**



1. In a tuner for converting radio frequency signals to a fixed intermediate frequency and designed for automatic frequency control, the combination comprising:

1. a first source of variable potentials for effecting automatic frequency control,

2. a mixer including:

a. a first transistor having base, emitter and collector electrodes,

b. an input circuit for said mixer comprising an r.f. transformer having a first winding tuned to resonance and coupled to a source of r.f. signals; and an untuned, secondary winding connected to said base electrode for coupling signals thereto, and connecting said base electrode to said first source in a path of low d.c. impedance,

c. a mixer output circuit connected to said collector electrode and tuned to said fixed intermediate frequency for deriving signals at the intermediate frequency,

3. an oscillator comprising:

a. a second transistor connected in circuit with said first transistor having base, emitter and collector electrodes,

b. a bypass capacitor for grounding the base of said second transistor at the oscillator frequency,

c. a second source of d.c. potentials connected between the base electrode of said second transistor and ground,

d. a tuned resonant circuit for said oscillator providing a single path of low d.c. impedance between the emitter of said first transistor and the collector of said second transistor to equalize the currents between said transistors to transfer the voltage variations in said first source less the voltage drop in the input junction of said first transistor to the collector of said second transistor, and to provide oscillator injection into said mixer, and

e. a resistance connected between the emitter of said second transistor and ground for setting the desire current levels in both said transistors.

4,034,299

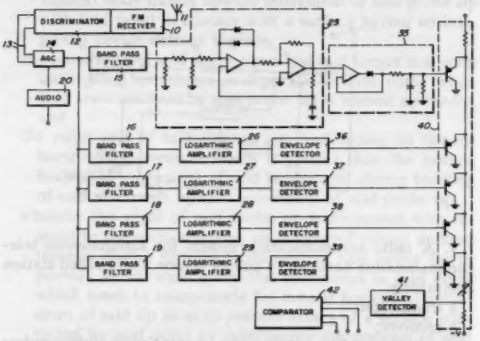
AUDIO SIGNAL QUALITY INDICATOR

Susumu Cho, Elk Grove Village; Paul Milton Erickson, Oak Park, and Gary Raymond Reynolds, Streamwood, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 29, 1975, Ser. No. 645,002

Int. Cl.² H04B 1/16, 17/00

U.S. Cl. 325—363 **4 Claims**



1. Signal quality indicator means for a radio receiver designed to pass a predetermined band and having a discriminator with an output of audio signals, said indicator means comprising:

a. a plurality of bandpass filters each having a bandpass substantially smaller and lying substantially within the predetermined band of audio signals, said bandpass filters being coupled to the output of the discriminator, and each of said bandpass filters passing a portion of the predetermined band of audio signals which is spaced from the portion passed by each of the other bandpass filters; and

b. means connected to said bandpass filters for selecting the bandpass filter with the lowest amplitude output and providing an output signal indicative of the amplitude thereof.

4,034,300

CIRCUIT ARRANGEMENT FOR EVALUATING RECEIVED OSCILLATIONS OF A PREDETERMINED FREQUENCY

Wulf-Christian Streckenbach, Hemmingen, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Nov. 26, 1975, Ser. No. 636,222

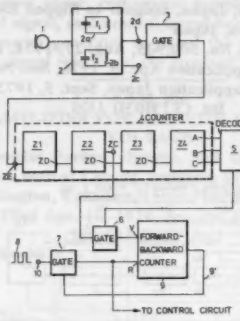
Claims priority, application Germany, Nov. 27, 1974, 2455991

Int. Cl.² H04B 1/06

U.S. Cl. 325—390 **10 Claims**

1. In a circuit arrangement for evaluating a received control signal of the type including a first signal of a first predetermined frequency and of a time duration which represents information, and a second signal which immediately follows the first signal in time and has a second predetermined frequency different than said first frequency, said circuit arrangement including first means for receiving the control signal and second means, connected to said first means, for determining the time duration of said first signal by counting the oscillations of the first signal and for supplying an output signal representative of the number of oscillations, and hence of said information, to a control circuit which responds to said information, the improvement wherein said second means includes a memory to which the oscillations of said first signal are fed and which stores a count representative of a number of re-

ceived oscillations of said first signal, and further means responsive to the receipt of said second signal for serially discharging the contents of said memory and for supplying said contents in series, as said output signal, to an output terminal connected to the control circuit.



4,034,301

MEMORY DEVICE WITH SHIFT REGISTER USABLE AS DYNAMIC OR STATIC SHIFT REGISTER

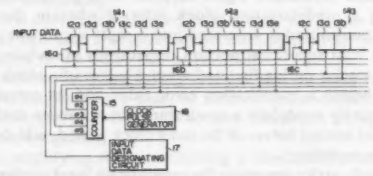
Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Dec. 23, 1975, Ser. No. 643,801

Claims priority, application Japan, Dec. 23, 1974, 49-146841; Dec. 27, 1974, 50-529

Int. Cl.² G11C *19/28, 11/40*

U.S. Cl. 328—37 **2 Claims**



1. An information memory device for storing a pluarl bit data character, comprising:

a shift register which includes a plurality of cascade connected register units, each register unit having a number N of sequentially arranged memory elements capable of storing digital information, and a number N of sequentially arranged transfer elements respectively coupled to said N memory elements, each of said memory elements and transfer elements being responsive to a supplied shift pulse for transferring digital information stored in a memory element to another memory element via transfer element, N being larger by one than the number of bits in one data character;

shift pulse generating means for supplying a shift pulse of the same phase to the transfer elements occupying the same sequential position in the respective register units and a number N of shift pulses having different phases to the transfer elements of each register unit from the transfer element disposed on the output side of said register unit;

shift circulation means coupled to said register units for causing an output delivered from the output terminal of each register unit to circulate through the output terminal of said register unit; and

input information changeover means including gating means coupled to the input terminal of each register unit for either supplying fresh information to the shift register in order to cause said shift register to act as a dynamic type shift register or circulating information already supplied through said shift circulation means to cause said shift register to act as a static type shift register.

4,034,302

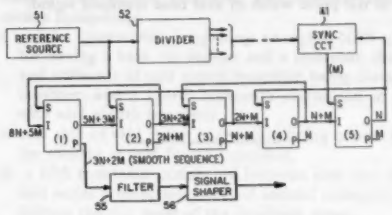
SMOOTH SEQUENCE GENERATOR FOR FRACTIONAL DIVISION PURPOSES

Carl Jerome May, Jr., Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 26, 1976, Ser. No. 690,100

Int. Cl.² H03K *21/00, 23/06*

U.S. Cl. 328—39 **6 Claims**



1. A smooth sequence generator capable of dividing a uniform pulse sequence from a reference source which is delivered to its input in accordance with a predetermined rational fraction comprising a plurality of routing circuit means coupled in tandem, each routing means having an input, a first and a second output and a control terminal that serves to route a pulse presented to the input of the routing means to said first or second output, the first output of each routing means connected to the next tandem-coupled routing means, a feedback connection from the first output of each routing means to the control terminal of the preceding routing means to control the routing of a pulse presented to the input of the latter, and synchronization means coupled to the source of the uniform pulse sequence and the first output of the last tandem-coupled routing means, said synchronization means providing an output signal to the control terminal of said last routing means to constrain the frequency or phase of the smooth sequence generator output to a synchronization signal derived from the uniform pulse sequence.

4,034,303

ELECTRONIC PULSE GENERATING CIRCUIT FOR ELIMINATING SPIKE PULSES

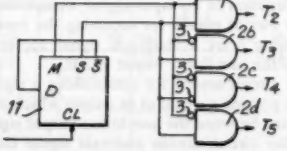
Mitsuharu Kodaira, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Nov. 26, 1975, Ser. No. 635,473

Claims priority, application Japan, Nov. 27, 1974, 49-136455

Int. Cl.² H03K *3/04, 1/17*

U.S. Cl. 328—62 **6 Claims**



1. An electronic pulse generating circuit comprising in combination divider stage means for receiving a time standard signal having a predetermined frequency and pulse width, said divider stage means including a first divider stage having master and slave flip-flops, said master flip-flop producing a first output signal having a frequency less than or equal to

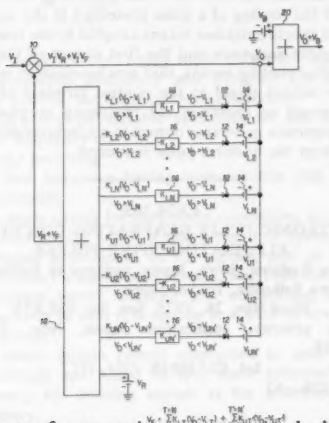
one-half said predetermined frequency of said time standard frequency signal in response to said time standard signal being applied thereto, said slave flip-flop being coupled to said master flip-flop for producing a second output signal having the same frequency as said first output signal in response to said time standard signal being applied thereto, said second output signal being time delayed with respect to said first output signal by a time interval equal to the time interval of the predetermined pulse width of the time standard clock signal, and logic means for receiving said first and second output signals and in response to detecting coincident predetermined states thereof, producing a timing pulse signal having a frequency less than or equal to one-half the predetermined frequency of the time standard signal and having a pulse width equal to the pulse width of said time standard signal.

4,034,304

METHOD AND APPARATUS FOR GENERATING A NON-LINEAR SIGNAL

David B. Hallock, Marion, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed June 8, 1976, Ser. No. 694,009
Int. Cl.² G06G 7/12
U.S. Cl. 328—142 **9 Claims**



1. Apparatus for generating an output signal which is a non-linear function of an input signal, comprising:

multiplier circuit means for receiving the input signal and multiplying it by a feedback signal applied thereto to provide the non-linear ouput signal;

threshold circuit means for establishing a signal threshold level to provide a signal at its output which is equal to the difference between the non-linear output signal from said multiplier circuit means and said signal threshold level whenever the non-linear output signal is in one region with respect to said signal threshold level and zero whenever the non-linear output signal is in the other region, and

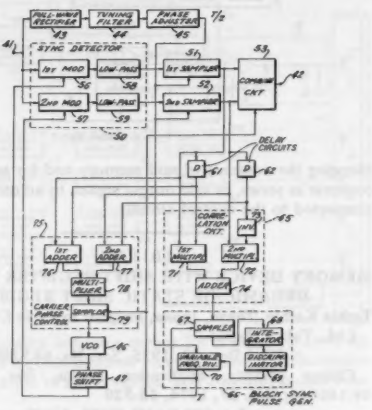
feedback circuit means for generating and applying to said multiplier circuit means said feedback signal as a direct function of the signal output of said threshold circuit means.

4,034,305

DEMODULATOR FOR SIGNALS HYBRID MODULATED BY MORE AND LESS SIGNIFICANT DIGIT SIGNALS IN SUCCESSION IN EACH CLOCK INTERVAL

Yoichi Sato, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Division of Ser. No. 500,905, Aug. 27, 1974, Pat. No. 3,980,971. This application Apr. 5, 1976, Ser. No. 673,910
Claims priority, application Japan, Sept. 5, 1973, 48-99933
Int. Cl.² H03D 1/00
U.S. Cl. 329—50 **4 Claims**



1. A demodulator for demodulating a received quadrature amplitude modulated signal supplied from a modulator and having a predetermined clock interval wherein the signal being transmitted is separated into a most significant portion and at least significant portion respectively modulating an in phase carrier during first and second halves of a clock period and wherein a quantization error value and its complement respectively modulate a quadrature phase carrier during the first and second halves of the same clock period, said demodulator comprising;

a local carrier generator for generating a local carrier signal;

a synchronous detector responsive to said local carrier signal for deriving in phase and quadrature phase base band components from said received signal;

means responsive to said received signal for deriving timing pulses of a repetition period equal to one half of said clock interval;

a first sampler responsive to said timing pulses for producing samples of said in phase base band component;

a second sampler responsive to said timing pulses for producing samples of said quadrature phase base band components;

first delay means for delaying the in phase component samples by said repetition period;

second delay means for delaying the quadrature phase component samples by said repetition period;

a correlation circuit means coupled to the outputs of said first and second delay means and said first and second samplers and responsive to the undelayed and delayed in phase and quadrature phase component samples for producing an output signal representative of the sums of the correlation between the delayed and undelayed in phase component samples of adjacent clock intervals and the correlation between the delayed and undelayed quadrature phase component samples of adjacent clock intervals;

a synchronizing pulse generator means responsive to said timing pulses and said correlation circuit output signal for producing synchronizing pulses appearing in synchronism

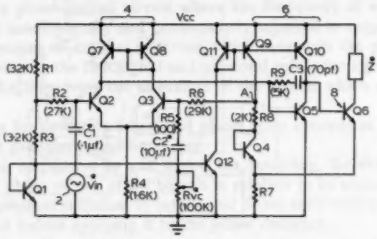
with and at the same repetition rate as the clock intervals of said received signal; and

a phase control circuit means responsive to said synchronizing pulses and said undelayed and delayed in phase and quadrature phase, component samples for producing a control signal, said control signal being supplied to said local carrier generator to adjust the phase of said local carrier signal relative to the received signal.

4,034,306
D.C. AMPLIFIER FOR USE WITH LOW SUPPLY VOLTAGE

Herbert Douglas Barber, Dundas, and Gary Curtis Salter, Burlington, both of Canada, assignors to Linear Technology Inc., Burlington, Canada

Filed Apr. 16, 1976, Ser. No. 677,632
Int. Cl.² H03F 3/45
U.S. Cl. 330—30 D **7 Claims**



1. An integrated circuit direct coupled amplifier adapted to operate from a single battery cell and having no more than a single base-emitter junction in series across said cell, said amplifier comprising:

a. a first connection adapted to be connected to one side of said cell and a second connection adapted to be connected to the other side of said cell,

b. a differential stage having first and second NPN transistors, each having a base, an emitter and a collector, the emitters of said first and second transistors being connected together,

c. an amplifying stage comprising a third NPN transistor having a base, an emitter and a collector,

d. an output stage comprising a fourth NPN transistor having a base, an emitter and a collector,

e. an input bias circuit for said first transistor, said input bias circuit comprising a first resistance having one side connected to said base of said first transistor and having a second side, a second resistance connected between said second side of said first resistance and said first connection, a fifth NPN transistor having a base, an emitter and a collector, a third resistance, said third resistance and the emitter and collector of said fifth transistor being connected in series between said second side of said first resistance and said second connection, the base and collector of said fifth transistor being connected together,

f. means connected to said base of said first transistor for receiving a signal to be amplified,

g. current conducting means connecting the emitters of said first and second transistors to said second connection,

h. a first current source load connected to said output means of said first transistor, said first current source load being a sixth PNP transistor having a base, an emitter and a collector, the emitter of said sixth transistor being connected to said first connection and the collector of said sixth transistor being connected to the collector of said first transistor,

i. first bias means biasing said sixth transistor, said first bias means being a seventh PNP transistor having a base, an emitter and a collector, the emitter of said seventh transistor being connected to said first connection and the collector of said seventh transistor being connected to the collector of said second transistor, the base and collector of said seventh transistor being connected together,

j. said collector of said first transistor being connected to said base of said third transistor,

k. a second current source load, separate from said first current source load, connected to said collector of said third transistor and operative when power is supplied from said battery cell to said first and second connections,

l. said collector of said third transistor being connected to said base of said fourth transistor,

m. negative feedback means for feeding back a portion of the signal from the emitter of said fourth transistor to said base of said second transistor, said negative feedback means comprising:

i. a series connection comprising: an eighth NPN transistor having a base, an emitter and a collector, the base and collector of said eighth transistor being connected together, and a fourth resistance connected in series with said eighth transistor,

ii. one side of said series connection being connected to the emitter of said fourth transistor,

iii. a fifth resistance connected between said one side of said series connection and said second connection for shifting the d.c. level of the feedback signal,

iv. a third current source load, separate from said first current source load, having one side connected to said first connection and having a second side connected to the other side of said series connection,

v. and a sixth resistance connected between the base of said second transistor and said second side of said third current source load, said third current source load being operative when power is supplied from said battery cell to said first and second connections,

n. frequency compensation means connected to the base of said third transistor, to stablize said amplifier, said compensation means comprising a series resistance and capacitance,

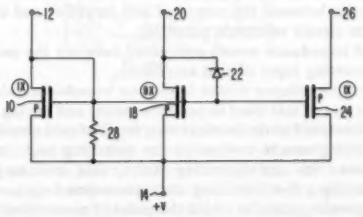
o. the base of said second transistor being substantially isolated from direct AC connection with the base of said first transistor,

and feedback attenuation means, including a second capacitance and a feedback attenuation resistance, connected in series between the base of said second transistor and said second connection.

4,034,307
CURRENT AMPLIFIER

Otto Heinrich Schade, Jr., North Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 4, 1976, Ser. No. 655,163
Int. Cl.² H03F 3/16
U.S. Cl. 330—35 **34 Claims**



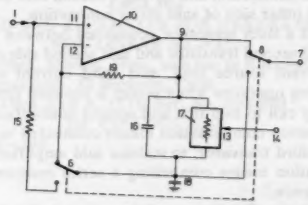
11. In a current mirror amplifier of the type having a plurality of input circuits and an output circuit, said input circuits having characteristic transconductances and being adapted for respective currents to flow therethrough, the improvement wherein:

at least one of said input circuits includes switching means, responsive to the relative magnitudes of the currents flowing through said input circuits, for switching said one input circuit into a first operational state in which the transconductance of said one input circuit affects the gain of said mirror when any of the respective ratios of the current flowing through said one input circuit to the respective currents flowing through the other input circuits is in excess of predetermined ratios in accordance with the respective ratios of the transconductance of said one input circuit to said other input circuits, and for switching said one input circuit to a second operational state wherein the transconductance of said one input circuit does not affect the gain of said mirror when all of said ratios of currents do not exceed said predetermined ratios.

4,034,308
AMPLIFIER WITH CONTROLLABLE TRANSMISSION FACTOR AND SWITCHABLE CONTROL CHARACTERISTIC

Jürgen Wermuth, Stederdorf; Gerhard Dickopp, and Ernst Schröder, both of Hannover, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed July 6, 1976, Ser. No. 703,119
Int. Cl.² H03F *1/36*
U.S. Cl. 330—86 **4 Claims**



1. In a circuit including a differential amplifier having a noninverting input and an inverting input, the circuit being arranged to cause the amplifier to have a transmission factor which is a function of the value of a control voltage, and being switchable between first and second operating states in which the amplifier has mutually complementary control characteristics, the circuit including voltage-controllable first impedance means having a control input connected to receive the control voltage and arranged to assume an impedance value which is a function of the value of the control voltage, the first impedance means being connected in a feedback path of the amplifier when the circuit is in its first operating state, the improvement wherein said circuit further comprises:

second impedance means;

connection means connecting said first and second impedance means to one another at a point of connection and connecting said first and second impedance means in series between the output of said amplifier and a point at the circuit reference potential;

third impedance means connected between the output and inverting input of said amplifier;

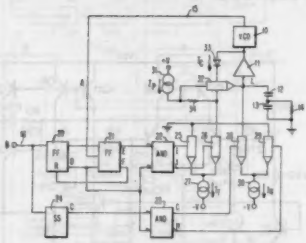
fourth impedance means having an impedance value equal to that of said third impedance means and having one side connected to the noninverting input of said amplifier; and

switching means connected for switching said circuit between its said operating states, said switching means having a first switching state corresponding to said first operating state, in which the point of connection between said first and second impedance means is connected to said amplifier inverting input and the voltage at the output of said amplifier constitutes the output voltage of said circuit, and a second switching state corresponding to said second operating state, in which the point of connection between said first and second impedance means is connected to the other side of said fourth impedance means and the voltage at that connection point constitutes the output voltage of said circuit.

4,034,309
APPARATUS AND METHOD FOR PHASE SYNCHRONIZATION

Julian Edgar Vaughn, Campbell, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1975, Ser. No. 643,714
Int. Cl.² H03B *3/04*
U.S. Cl. 331—1 A **7 Claims**



1. A phase locking oscillator system for synchronizing an output signal of a voltage controlled oscillator, having predetermined periodic characteristics of nominal frequency, with repetitive predetermined characteristics of an input signal applied to the system, comprising:

control voltage storage means including at least one capacitor for storing a control voltage;

a voltage controlled oscillator connected to receive said control voltage and whose frequency of operation is controlled by said control voltage;

a reference signal generating means adapted to receive said input signal and responsive to individual occurrences of said repetitive predetermined characteristic of said input signal to generate a reference signal indicating the lapse, since each said occurrence of said predetermined characteristic, of a reference interval exceeding one nominal period of said voltage controlled oscillator output signal by a predetermined time;

a positive constant current source;

a negative constant current source of equal magnitude;

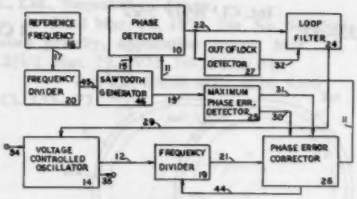
a switching means, connected to said current sources for causing application of current from either of said current sources to said control voltage storage means;

and a logic means connected to said switching means and responsive to at least said individual occurrences of said predetermined characteristic of said input signal to cause said switching means simultaneously to apply current from both said current sources to said control voltage storage means, said logic means being further responsive to said reference signal indication to cause said switching means to remove current from one of said current sources from said control voltage storage means and further responsive to the occurrence of at least two successive predetermined periodic characteristics of said oscillator output signal, subsequent to each said occurrence of said predetermined characteristic of said input signal, to cause said switching means to remove current from the other of said current sources from said control voltage storage means, whereby a minimum time between switchings of current from the same current source is established which is at least equal to said predetermined time by which said reference interval exceeds one period of said oscillator output signal.

4,034,310
PHASE-LOCKED LOOP OSCILLATOR

Thomas F. Coe, 3173-39 Bancroft Drive, Spring Valley, Calif. 92077

Filed Jan. 5, 1977, Ser. No. 757,112
Int. Cl.² H03B 3/04
U.S. Cl. 331—11 6 Claims



1. In a phase-locked circuit where the frequency of a first signal is automatically and continuously adjusted in response to the output of a phase detector which measures the phase error between the first signal and a second reference signal, a device for improving the operation of the circuit which comprises:

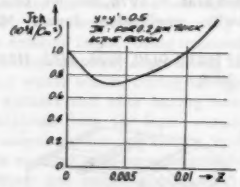
means for detecting when said phase error exceeds at least one predetermined limit; and

means, responsive to said means for detecting, for shifting the phase of one of the signals in relation to its source by an amount sufficient to return said phase error within said limit before applying it to the phase detector.

4,034,311
SEMICONDUCTOR LASER

Kunio Itoh, and Morio Inoue, both of Takatsuki, Japan, assignors to Matsushita Electronics Corporation, Kadoma, Japan

Continuation of Ser. No. 445,895, Feb. 26, 1974, abandoned. This application Mar. 30, 1976, Ser. No. 671,948
Claims priority, application Japan, Feb. 26, 1973, 48-22867; Feb. 26, 1973, 48-22868
Int. Cl.² H01S 3/00
U.S. Cl. 331—94.5 H 4 Claims



1. A double heterostructure laser comprising:

an n-type GaAs substrate,

a first region of n-type $Ga_{1-y}Al_yAs$ ($1 \geq y > 0$) epitaxially grown on one principal face of said substrate,

a second and active region of $Ga_{1-z}In_zAs$ epitaxially grown on said first region, the value of z being greater than zero and is selected to minimize the current threshold of the laser, by being less than the theoretical value that makes the lattice constant of said active region coincide with those of the neighboring regions,

a third region of p-type Ga_{1-y} Al_y As ($1 \geq y' > 0$) epitaxially grown on said second region,

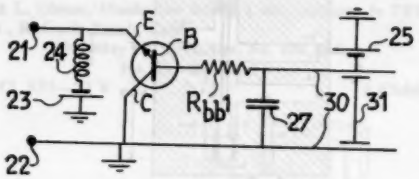
and

a fourth region of p-type GaAs epitaxially grown on said third region.

4,034,312
MICROWAVE OSCILLATOR USING A TRANSIT TIME TRANSISTOR

Marc Armand, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Mar. 26, 1976, Ser. No. 670,757
Claims priority, application France, Mar. 28, 1975, 75.09920
Int. Cl.² H03B 5/18, 9/12; H03F 3/55, 3/60
U.S. Cl. 331—96 10 Claims



1. A device utilizing transit time effects, comprising:

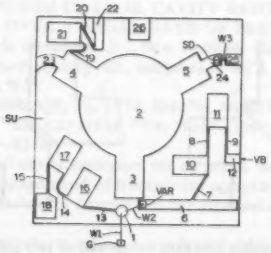
a semiconductor structure of the transistor type with emitter, base and collector terminals, able to generate a high frequency oscillation at a predetermined frequency, by applying of a direct current voltage across emitter and collector terminals;

a transmission line of adjustable length having its input across said base and collector terminals and its output short-circuited at high frequency said adjustable length being able to vary on both sides of a value equal to a quarter of wavelength at said predetermined frequency.

4,034,313
MICROSTRIP GUNN OSCILLATOR WITH VARACTOR TUNING

Stewart Barry Jones, and Keith Rushworth Williams, both of Stockport, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 14, 1975, Ser. No. 577,315
Claims priority, application United Kingdom, May 20, 1974, 22477/74
Int. Cl.² H03B 7/14, 9/12
U.S. Cl. 331—96 20 Claims



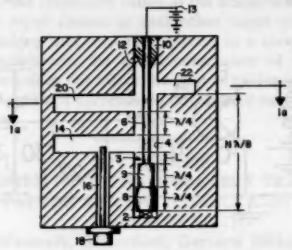
1. A microwave oscillator arrangement comprising a dielectric substrate, a microstrip resonator formed on a portion of the substrate, a negative-resistance oscillator device external to the resonator, and means for coupling the negative-resistance oscillator device to the resonator, whereby substantially all the R.F. power produced by the negative-resistance oscillator device is fed into the resonator, means for coupling R.F. power out of the resonator into a load, and a variable reactance connected in series between the negative-resistance oscillator device and the resonator whereby to adjust the operating frequency of the oscillator arrangement.

4,034,314

MICROWAVE DIODE COAXIAL CIRCUIT OSCILLATOR IMPROVEMENT

Michael Dydyk, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed June 24, 1976, Ser. No. 699,722
Int. Cl.² H03B 7/14
U.S. Cl. 331—101 6 Claims



1. In a coaxial microwave oscillator circuit having at least one negative resistance semiconductor diode, and at least one matched terminating load wherein the at least one diode and the at least one load are positioned at opposite ends of at least one coaxial circuit and an output signal is coupled from a point intermediate the diode and the load, the improvement comprising:

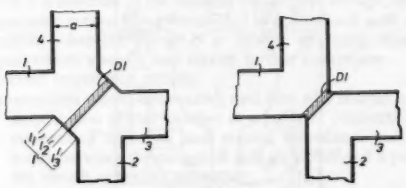
an unloaded cavity of resonant frequency, f_0, coupled to the at least one coaxial circuit at a point one-quarter wavelength at frequency f_0 from the output signal coupling points.

4,034,315

WAVEGUIDE DIRECTIONAL COUPLER

Udo Unrau, Lagesbuttel, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed Feb. 27, 1976, Ser. No. 662,088
Claims priority, application Germany, Mar. 8, 1975, 2510212
Int. Cl.² H01P 5/18
U.S. Cl. 333—10 10 Claims



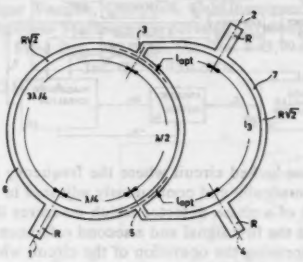
1. In a waveguide junction composed of two pairs of rectangular waveguide branches arranged in the manner of the arms of a cross with at least one partially radiation-reflecting obstacle disposed in the junction diagonally of the arms to produce a directional coupler, the improvement wherein said junction comprises two waveguide sections each disposed at a respective side of said obstacle and interposed between said obstacle and a respective pair of waveguide branches, said waveguide sections constituting means for matching the impedance at the surface of the obstacle to the values required at the regions of connection between each pair of branches to permit the coupler to operate in a frequency range in which the useful waveguide mode can propagate while spurious modes excited in the coupler are evanescent.

4,034,316

CIRCUIT ARRANGEMENT IN STRIP LINE TECHNIQUE FOR A WIDE BAND BALANCING ELEMENT

Hans Bex, Aachen, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 7, 1975, Ser. No. 620,299
Claims priority, application Germany, Oct. 22, 1974, 2449999
Int. Cl.² H01P 5/22
U.S. Cl. 333—11 2 Claims



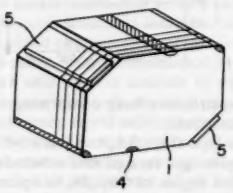
1. A circuit arrangement in strip line technique for a wide-band balancing element operating at a mid-band wave length λ, comprising: a hybrid ring, whose conductors are arranged on a base plate and which comprises an input gate, a first output gate which is moved over 3λ/4 in one direction with respect to this input gate, a second output gate which is moved over λ/4 in the opposite direction with respect to the input gate, the two output gates of the hybrid ring being interconnected by a partial ring conductor having a length of $2 \times l_{opt} + l_3$ where $l_{opt} \approx \lambda/60$, and including additional output gates each arranged at a distance of the length l_{opt} from said first and second output gates and spaced apart at a distance of the length l_3, said partial ring being the only other path between said two output gates.

4,034,317

ULTRASONIC DELAY LINES AND METHOD OF MAKING THE SAME

Michihiko Uemura; Tohru Kanbara, both of Yokohama, and Yutaka Igarashi, Kawasaki, all of Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Filed Mar. 4, 1976, Ser. No. 663,703
Claims priority, application Japan, Mar. 13, 1975, 50-29468
Int. Cl.² H03H 9/30, 9/26, 9/32; H01L 41/04
U.S. Cl. 333—30 R 8 Claims



1. In a multiple reflection type solid ultrasonic delay line comprising a solid ultrasonic delay medium in the form of a thin flat plate having input and output transducers and reflection elements formed on the periphery thereof, the improvement comprising:

at least one arc shaped groove formed in a side surface of said plate having elements from which the reflection of ultrasonic vibration is undesirable; and,

a low melting point metallic material provided in said groove for vibration absorption.

4,034,318

ELASTIC SURFACE WAVE FILTER

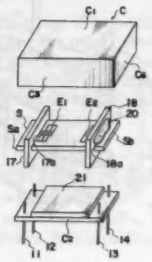
Hideki Ishiyama; Atushi Inoue, and Hideharu Ieki, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan

Filed Mar. 12, 1976, Ser. No. 666,304

Claims priority, application Japan, Mar. 12, 1975, 50-34112[U]; Mar. 19, 1975, 50-37826[U]

Int. Cl.² H03H 9/10, 9/26, 9/06

U.S. Cl. 333—72 **4 Claims**



1. An elastic surface wave filter device which comprises:

a casing of substantially cubic body having top and bottom wall portions opposed to each other, a pair of opposed side wall portions and a pair of opposed end wall portions, all connected together to provide an interior chamber therein;

a substrate of piezoelectric material housed within said interior chamber and extending in substantially parallel relation to any of said top and bottom wall portions, said substrate including interleaved comb-type input and output transducing systems rigidly mounted on one of the opposed surfaces of said substrate which faces said top wall portion, said input and output transducing systems being respectively located adjacent the opposed ends of said substrate in spaced, but piezoelectrically coupled, relation to each other;

first and second elastic support means, made of rubber material, for steadily supportion said substrate within said interior chamber, said first and second elastic support means serving as substantial cushioning elements for absorbing an external impact being imposed on said filter device and for concurrently suppressing that portion of elastic surface waves which, during energization of said transducing systems and after having been propagated along the substrate from the input transducing system towards the output transducing system, may be reflected back towards such an area as substantially defined between said input and output transducing systems, said first and second electric support means being so positioned between the input transducing system and one of the opposed end wall portions adjacent said input transducing system and between the output transducing system and the other of said opposed end wall portions adjacent said output transducing system, respectively, facing the direction of propagation of the reflected surface waves towards said area on said substrate; and

a third elastic support means secured in position between the other of the opposed surfaces of said substrate and said bottom wall portion;

wherein each of said first and second elastic support means comprises a support member of substantially inverted L-shape having an upright portion and an overhang integral with said upright portion, and said third elastic support means is constituted by a support member of substantially plate-like configuration having opposed ends integral with said upright portions, said substrate being supported in such a manner that, while said other of said opposed surfaces of said substrate is held flat against said support member, the opposed end portions of said substrate are substantially clamped into betweeen said overhang portions and said opposed ends of said support member, respectively.

4,034,319

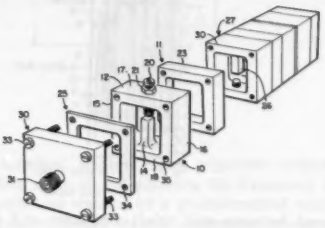
COUPLED BAR MICROWAVE BANDPASS FILTER

David L. Olsson, Manhattan Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed May 10, 1976, Ser. No. 684,804

Int. Cl.² H01P 1/20

U.S. Cl. 333—73 R **6 Claims**



1. A microwave bandpass filter of the coupled bar type comprising:

a. a plurality of resonator sections, each consisting of a single unitary metallic structure having four connected walls forming a hollow member of substantially rectangular cross-section providing two ground planes and a resonating bar integral with said structure and extending from one of the walls parallel to the ground planes;

b. a plurality of spacer sections each matching the dimensions of the walls of a member and having a substantially rectangular cross-section; and

c. means for connecting alternate resonator sections and spacer sections for forming a filter of predetermined properties.

4,034,320

HIGH POWER COAXIAL CAVITY RESONATOR TUNABLE OVER A BROAD BAND OF FREQUENCIES

LeRoy Francis Heckman, Jr., New Holland, Pa., and James Bruce Pickard, Quincy, Ill., assignors to RCA Corporation, New York, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,076

Int. Cl.² H01P 7/04; H03F 3/60

U.S. Cl. 333—82 B **6 Claims**

1. A coaxial cavity resonator for an active device tunable over a given broad band of frequencies comprising:

a first conductor for coupling to one terminal of said active device,

a second tubular conductor concentric with and spaced about said first conductor for coupling to a second terminal of said active device,

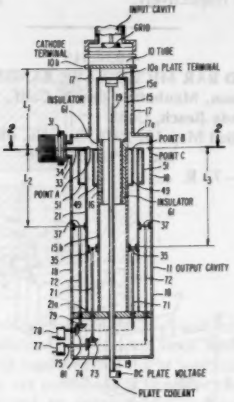
a third intermediate tubular conductor coaxially spaced between said first and second conductor, said third intermediate tubular conductor beginning at a given distance along said cavity from said active device and extending to that end of said cavity remote from said active device,

a fixed position output coupler having a given impedance with a first terminal directly connected to said third conductor at said given distance from said active device and a second terminal connected to said second conductor,

said first and second conductors being dimensioned to present over said given band of frequencies an inductive

impedance across said first and second conductors at said given distance from said active device,

a pair of concentric shorting stubs with a first stub positioned between said third conductor and said first conductor to present a first capacitive reactance at said given distance from said active device and a second stub positioned between said third conductor and said second conductor to present a second capacitive reactance at said given distance from said active device in series with said first capacitive reactance and in shunt with said coupler, said stubs being adjustable for resonating the inductive reactance therewith to tune said cavity over said broad band of frequencies.

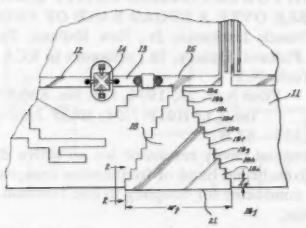


4,034,321

METHOD AND APPARATUS FOR MICROSTRIP TERMINATION

James H. Ward, Jr., and Max W. Medley, Jr., both of Largo, Fla., assignors to E-Systems, Inc., Dallas, Tex.

Filed Apr. 15, 1976, Ser. No. 677,343
Int. Cl.² H01P *1/24*
U.S. Cl. 333—84 M **12 Claims**



1. A transmission system comprising:

a transmission line formed on an insulating substrate;

a conductive layer terminating stub connected to said transmission line for terminating said transmission line and having a predetermined width at a point of connection to said transmission line, said stub having a progressively and incrementally increasing width as the distance from said transmission line increases,

a ground plane also formed on the insulating substrate, and

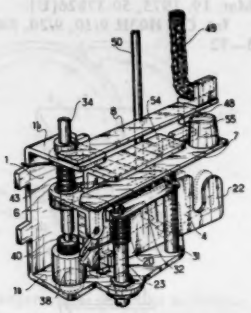
a conductive layer shunt connected to said stub and to said ground plane to terminate said transmission line in a d.c. short circuit ground.

4,034,322

DEVICE FOR PROTECTION AGAINST CURRENT OVERCHARGES

Paul Canonne, Barentin, France, assignor to Societe d'Apparetillage Electrique Saparfi, Saint-Marcellin, France

Filed Nov. 11, 1975, Ser. No. 631,155
Claims priority, application France, Nov. 15, 1974, 74.37703
Int. Cl.² H01H *77/06*
U.S. Cl. 335—42 **7 Claims**



1. A device for protection against overcharges of current, comprising a thermal protection device and a magnetic protection device fixed on a mounting plate (1), the thermal protection device comprising an active bimetal (8), a compensating bimetal (7) parallel to the active bimetal and a shield (54) situated between the active bimetal and the compensating bimetal, the magnetic protection device being constituted by a relay comprising, on a magnetic circuit (2) and insulated therefrom, a winding (5) and a movable armature (4), characterized in that the said mounting plate comprises two tabs (1*a*, 1*b*) in that the magnetic protection device is fixed on one (1*a*) of the said tabs, in that the active bimetal (8) is fixed by one end on another tab (1*b*) of the mounting plate, in that the compensation bimetal (7) is fixed by one end to a striker (6) integral with a pivot (34) installed between a tab (1*b*) by an insulating bearing (44) and another tab (1*a*) of the mounting plate, in that the said striker is fixed against a shoulder (35), in that a striker spring (43) is wound around one end of the said pivot between the said bearing (44) and the said striker, the said striker spring having one insulated end (46) fixed to the mounting plate and one end (47) fixed to the striker and exerting a pivoting force on the said striker and in that the compensating bimetal (7) comprises, at one free end, a compensator stop (55), having a given height, in contact, under the action of the said striker spring and over a length at most equal to its height, with a bimetal stop (48) fixed to one end of the active bimetal opposite to that by which it is fixed onto the mounting plate.

4,034,323

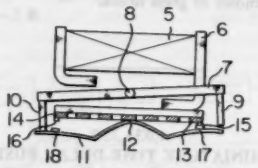
MAGNETIC RELAY

Rokuro Homma, Tokyo, Japan, assignor to Oki Electric Industry Company, Ltd., Tokyo, Japan

Filed Mar. 24, 1975, Ser. No. 561,379
Int. Cl.² H01H *67/02*
U.S. Cl. 335—129 **5 Claims**

1. A magnetic relay comprising a core, a coil wound on said core, an armature positioned movably near said core by magnetic force, and a plurality of pairs of contact points, each pair of which being arranged so as to be able to open and close according to the movement of said armature, characterized in that said relay further comprises a contact spring the center of which is fixed, and the side portions of which extend from said center and are each provided at their respective ends with

some of said contact points, a pair of dielectric card means, one of which means is affixed to one end of said armature and in response to a magnetic force on said one end forcibly engages one of said side portions to open a contact on the end thereof, and the other end of which means is affixed to the other end of said armature and in response to a force on said armature forcibly engages the other of said side portions to open a contact on the end thereof, and a dielectric support plate having a support surface for supporting one of the contacts of each of said contact pairs whose other contact is provided on said contact spring.



4,034,324

DEFLECTION DEVICE FOR USE IN COLOR TELEVISION RECEIVER

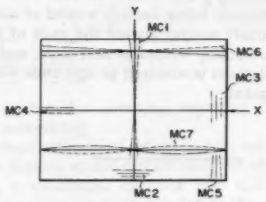
Shunichi Sano, Zama, and Youji Ogawa, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 16, 1975, Ser. No. 613,957

Claims priority, application Japan, Sept. 20, 1974, 49-109417

Int. Cl.² H01F *1/00*

U.S. Cl. 335—212 **5 Claims**



1. In a deflection device for use in a color television receiver, which is fitted to a neck portion of a color picture tube having electron guns emitting three electron beams, said electron guns being arranged in a horizontal plane and which comprises a deflection yoke for horizontally and vertically deflecting said three electron beams on a screen and at least a soft magnetic material piece fitted on said deflection yoke, the improvement which comprises a deflection yoke which is so designed as to eliminate mis-convergences MC_1, MC_2, MC_3, MC_4 and MC_7, in the mis-convergence MC_1 the three electron beams being horizontally displaced from each other at both the upper and lower end portions of the vertical or Y axis, in the mis-convergence MC_2, the three electron beams being vertically displaced from each other at both the upper and lower end portions of the Y axis, in the mis-convergence MC_3, the three electron beams being horizontally displaced from each other at both the right and left end portions of the horizontal or X axis, in the mis-convergence MC_4 three electron beams being vertically displaced from each other at both the right and left end portions of the X axis, and in the misconvergence MC_7 scanning lines of the three electron beams being vertically displaced at intermediate portions between the Y axis and each of said right and left ends of the screen; and at least a soft magnetic material piece fitted to an end portion of said deflection yoke nearer to the screen of the color picture tube so as only to eliminate a mis-convergence MC_5 wherein the three electron beams are horizontally displaced from each other at the diagonal end portions of the screen and a mis-convergence MC_6 wherein the three electron beams are vertically displaced from each other at the diagonal end portions of the screen.

4,034,325

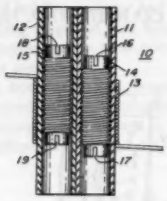
COARSE AND FINE ADJUSTMENT WARP COIL

Sviatoslav Zarkov, River Forest, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 26, 1976, Ser. No. 661,665

Int. Cl.² H01F *21/06*

U.S. Cl. 336—75 **6 Claims**



1. A two-terminal, single-winding adjustable inductor for connection into a circuit for adjusting the frequency thereof comprising only one winding of a predetermined number of turns and a predetermined interior dimension, two insulating tubes disposed side by side inside of said winding, and two cores of predetermined permeability, one each of said cores being disposed in one each of said insulating tubes, both of said cores being disposed within the interior of said winding for decreasing the coil inductance per unit turn, each of said cores being moveable relative to the other one for course adjustments and one for fine adjustments.

4,034,326

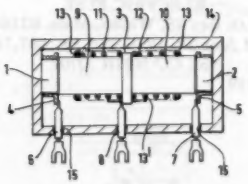
TEMPERATURE SENSITIVE TRIP DEVICE

John Hill, Bickley, and Henryk Turczanski, Beckenham, both of England, assignors to Comtelco (U.K.) Limited, Tonbridge, England

Filed Apr. 17, 1975, Ser. No. 569,013

Int. Cl.² H01H *37/04*; H02H *1/04*

U.S. Cl. 337—34 **4 Claims**



1. A temperature sensitive trip device comprising:

an elongated, cylindrical, electrically insulative support;

at least first and second electrical terminals affixed to said support and spaced axially along the length thereof;

a resilient, cylindrical coil spring mounted about said support and axially extending therealong between said at least first and second terminals and electrically connected to one of said terminals;

said coil spring being capable of assuming a first condition in which a connection is formed between said first and second terminals and a second condition in which said spring is resiliently biased out of connection between said first and second terminals;

a rigid, solidified, fusible material disposed along the length of said coil spring and joining together each coil of said

spring to retain said spring in said second condition in a compressed state against the resilient bias thereof;

said fusible material, upon melting by heat from said support, causing release of said coil spring into a biased axial movement to said first condition.

4,034,327

TIMING PULSE GENERATING SWITCH

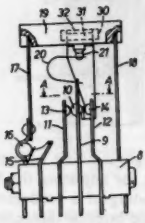
Holger Nicolaisen; Finn Schnoor Andersen, both of Nordborg, and Leif Borge Tandrup, Sonderborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Oct. 22, 1975, Ser. No. 624,846

Claims priority, application Germany, Oct. 28, 1974, 2451090

Int. Cl.² H01H *61/00, 71/16*

U.S. Cl. 337—41 4 Claims



1. A timing pulse generating switch assembly comprising housing and slide members in spaced apart relation, bimetallic spring means connecting said members to provide relative movement therebetween with said slide member having an at rest position and an operative position, three contact arms carrying contacts attached to said housing, a snap spring between the center one of said arms and said slide member, a blocking member carried by said slide member which is actuatable relative to said slide member from an inoperative non-blocking position to an operative blocking position, said blocking position being selectively between said center one of said arms and a selected one of said other two arms to selectively block the initial movement of said center arm or the return movement of said center arm, and means for actuating said blocking member.

4,034,328

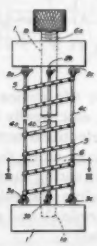
ELECTRIC FUSE

Erwin Salzer, P.O. Box 45, Waban, Mass. 02168

Filed June 28, 1976, Ser. No. 687,741

Int. Cl.² H01H *33/02*

U.S. Cl. 337—159 9 Claims



1. An electric fuse including

a. a tubular casing of electric insulating material;

b. a pair of terminal elements closing the ends of said casing;

c. a granular arc-quenching filler inside said casing;

d. a plurality of spaced flexible cords of glass fibers having ends affixed to said terminal elements and stressed in a direction longitudinally thereof so as to form a relatively stiff system defining the lateral edges of a prism; and

e. fusible element means inside said casing, embedded in said filler, conductively interconnecting said pair of terminal elements and supported by said stiff system of spaced bundles of glass fibers.

4,034,329

MINIATURE TIME-DELAY FUSE

Hiroo Arikawa, 1-14-9, Oyamadai, Setagaya, Tokyo, and Masaya Maruo, 1-29-14, Shinkoyasu, Kanagawa, Yokohoma, both of Japan

Filed Apr. 30, 1976, Ser. No. 682,129

Claims priority, application Japan, May 2, 1975, 50-052563

Int. Cl.² H01H *85/04, 85/08*

U.S. Cl. 337—163 16 Claims

1. An electrical component for use in a time-delay fuse comprising an elongated generally cylindrical core member of low heat conductivity defined by a middle region, two intermediate regions and two ends, and a fusible metallic wire element of high melting point wound on said core member, said fusible wire element being densely wound at said middle region, thence sparsely wound toward the ends of said core member and again densely wound at said ends, and wherein said fusible wire element is soldered at said ends with a high melting solder element.

4,034,330

SHEATH HEATER

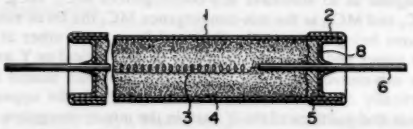
Eizo Goto, Chigasaki, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 17, 1975, Ser. No. 613,974

Claims priority, application Japan, Sept. 19, 1974, 49-107965; Sept. 19, 1974, 49-112854

Int. Cl.² H01C *1/03*

U.S. Cl. 338—238 7 Claims

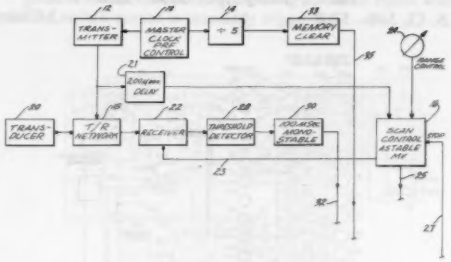


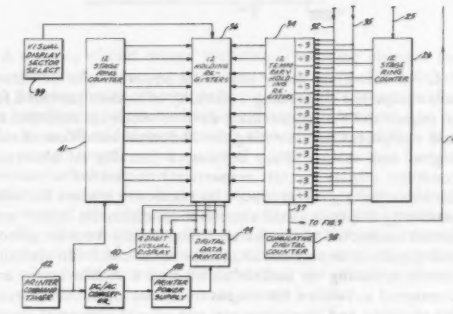
1. A sheath heater comprising a pipe having at least one open end, an electrically heat radiant body provided inside the pipe, an electrical terminal connected to the heat radiant body, a region of electrically insulating powder having a high melting point and loaded inside the pipe to fix the heat radiant body, a sealing member for said open end having a glass compound layer formed by a molten glass permeating into the insulating powder region at said open end, and a glass layer formed on the outer surface of the glass compound layer being thinner than the glass compound layer.

4,034,331
FISH COUNTER

Albert S. Menin, Sylmar, and Robert M. Bridges, Northridge, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.

Filed Dec. 29, 1975, Ser. No. 644,483
Int. Cl.² G01S 9/70
U.S. Cl. 340—3 R 9 Claims





1. A system for counting migrating fish swimming in a stream comprising:

a mechanical support structure adapted to be positioned on the bottom of said stream near the shore thereof extending a substantial distance into said stream essentially perpendicularly with respect to the direction of stream flow, said structure comprising a lightweight elongated tubular frame;

webbing means suspended from the downstream side of said structure to prevent fish of substantial size from passing under said support structure;

an acoustic transducer having a narrow beam width positioned adjacent the shore end of said structure and directed to insonify a volume of water in said stream immediately above said structure, and to receive echo return signals therefrom;

and electrical means connected to said transducer including a source of electrical power,

a master clock connected to said source for emitting pulses at regular intervals,

a transmitter responsive to said clock pulses for providing echo ranging pulse signals to said transducer,

a delay circuit responsive to said transmitted pulses,

a receiver and threshold detector means connected to said receiver,

multivibrator means responsive to signals passed by said threshold detector for providing pulse signals of essentially uniform magnitude representing fish returns,

a multistage ring counter providing a plurality of successive output pulses;

a scan control multivibrator responsive to said delay circuit for enabling said receiver and for enabling said ring counter,

a first holding register having a plurality of stages corresponding to the number of stages of said ring counter including a divider circuit at the input to each stage and connections from each stage of said ring counter to a corresponding one of said divider circuits to thereby provide pulse signals to each stage of said holding register representing one sector along the length of said mechanical support structure;

means connecting said multivibrator means to each of said divider circuits;

divider circuit means connected to said master clock, and means responsive to said divider circuit means output for providing a clearing or reset signal to each of said divider circuits;

a second holding register having a number of stages corresponding to the number of stages of said ring counter and said first named holding register and means interconnecting corresponding stages of said holding registers;

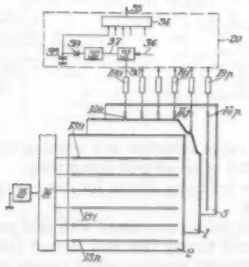
display means connected to said second holding register including timer means,

and second ring counter means responsive to said timer means and connected to said second holding register for causing the accumulated counts in said second holding register to be displayed on said display means.

4,034,332
ULTRASONIC TRANSMITTING AND RECEIVING DEVICES USING DIELECTRIC TRANSDUCERS

Pierre M. Alais, Dampierre, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Courbevoie, France

Continuation of Ser. No. 240,993, April 4, 1972, abandoned. This application Oct. 15, 1974, Ser. No. 514,930
Int. Cl.² H04R 19/04
U.S. Cl. 340—9 7 Claims



1. A device for ultrasonic scanning of transmitted or received ultrasonic wave pulses, comprising: a transducer having a thin sheet of dielectric material tightly packed over its whole active surface in contact with and between the surfaces of an insulating backing plate and a thin insulating protective plate which separates the dielectric sheet from an ultrasonic transmission medium, part at least of the surfaces of both plates in contact with said dielectric material being electrically conductive for constituting separate electrodes, the electrode carried by said backing plate at least being fractioned to constitute at least one array of several conductive areas; and an electric circuit for D.C. electrical biasing of said areas according to a predetermined time sequence, the shape and arrangement of the areas and said time sequence providing a predetermined transmission or reception wave pattern.

4,034,333

METHOD OF REDUCING MONOCHROMATIC INTERFERENCE IN CONTINUOUS WAVE SEISMIC PROSPECTING

Allen B. Cunningham, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Sept. 29, 1975, Ser. No. 617,762
Int. Cl.² G01V 1/02, 1/36
U.S. Cl. 340—15.5 TA 26 Claims

1. In a continuous wave method of seismic prospecting wherein a seismic signal is transmitted into the earth from a first location and reflections of the signal from the subsurface are thereafter detected at a second location and cross-correlated with the transmitted signal, the method of reducing the effect of a monochromatic interference signal on the signal resulting from the cross-correlation which comprises:

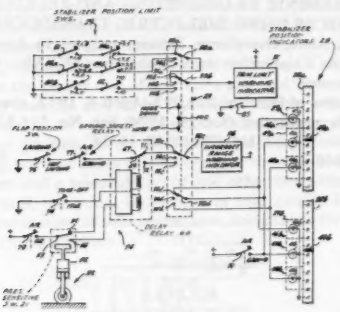
transmitting a seismic signal having a power spectrum containing a substantially null component therein at a frequency nearer to the interference signal frequency than either of the frequencies of the components in said power spectrum adjacent said substantially null component are to said interference signal frequency.

4,034,334

AIRFOIL POSITION RANGE SELECTING, INDICATING AND WARNING SYSTEM FOR AN AIRCRAFT

Donald Cooper Allyn, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed July 14, 1975, Ser. No. 595,505
Int. Cl.² G08G 5/00
U.S. Cl. 340—27 R 11 Claims



1. A position range selection and warning apparatus for a positionable airfoil of an aircraft comprising:

airfoil position indicator means for displaying the position of an airfoil;

range indicator means associated with said position indicator means and having first and second indicating states defining different, predetermined ranges of airfoil positions;

selector switch means connected to said range indicator means and having first and second positions, said range indicator means being responsive to said switch means to alternatively assume said first and second indicating states when said switch means is in said first and second positions respectively;

load sensing means associated with a landing gear that is located adjacent one end of the aircraft fuselage for producing a signal indicative of a load supported by such landing gear; and

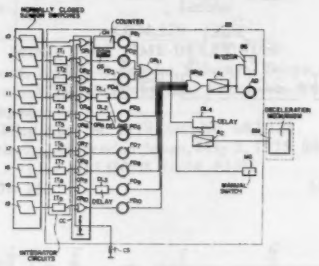
warning indicator means connected to said load sensing means and to said selector switch means and being responsive to a predetermined relationship between said signal produced by said sensing means and the positions of said switch means to produce a warning indication.

4,034,335

AUTOMATIC SAFETY AND ALARMING APPARATUS FOR CONSTRUCTION EQUIPMENTS

Yoshiaki Harazoe; Shigeru Kurakami, both of Hirakata; Michio Okamoto, Ayase, and Ichiro Hasegawa, Tokyo, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Aug. 27, 1975, Ser. No. 608,261
Claims priority, application Japan, Aug. 30, 1974, 49-98855
Int. Cl.² B60Q 5/00; G08B 19/00
U.S. Cl. 340—52 F 3 Claims



1. An automatic safety and alarm apparatus for construction equipment comprising a plurality of sensors provided for an engine and various auxiliary devices which are mounted on said equipment for detecting the abnormal condition of said engine and said auxiliary devices, a plurality of abnormal condition display circuits respectively connected to receive the abnormal signals produced by respective sensors for independently displaying said abnormal conditions, a logical sum circuit connected to receive abnormal signals from the abnormal condition display circuit, an abnormal condition alarming circuit including an audible alarm and a visible alarm and connected to receive the output from said logical sum circuit for alarming and displaying any one of said abnormal conditions, a delay circuit connected to receive the output of a sensor provided for the engine, and a deceleration mechanism operated by the output from said delay circuit for decreasing the speed of the engine or stopping the same when an abnormal condition occurs in the engine, said deceleration mechanism comprising an electromagnetic solenoid energized by the output from said delay circuit, a first cam interlocked with an acceleration pedal, a second cam interlocked with a throttle lever of said engine, and a means responsive to the energization of said electromagnetic solenoid for coupling and decoupling said first and second cams from each other.

4,034,336

ELECTRONIC MONITOR SYSTEM FOR AUTOMOBILES

Hiroshi Arai, Aichi, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha and Nippon Denso Co., Ltd., both of Aichi, Japan

Filed Aug. 4, 1975, Ser. No. 601,801
Claims priority, application Japan, Aug. 13, 1974, 49-92627
Int. Cl.² G08B 19/00
U.S. Cl. 340—52 F 12 Claims

1. An electronic monitor system for automobiles, which comprises:

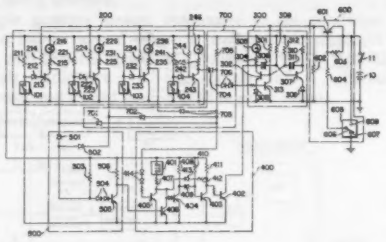
a plurality of defect sensing means located at different locations within said automobile for sensing a defect in various functions throughout the automobile, and for producing a signal whenever there is a defect in a sensed function;

a plurality of indicating circuit means for indicating a defect in one of said sensed functions, each of said indicating circuit means being responsive to one of said signals produced by said plurality of defect sensing means, said indicating circuit means comprising:

a plurality of indicator lights connected to said plurality of defect sensing means; and

transistor circuit means for controlling the supply of electric current to said plurality of indicator lights in response to said signal from said plurality of defect sensing means for turning on one of said plurality of indicator lights which indicates the location of the sensed defect;

a control circuit means including a manually-operated triggerable switch means for generating a control signal when said switch means is manually triggered;



a warning circuit means including a warning element for producing a warning whenever one or more of said defect sensing means senses a defect in a sensed function and for producing a less bothersome warning whenever one or more of said defect sensing means senses a defect in a sensed function and a control signal is generated by said control circuit; and

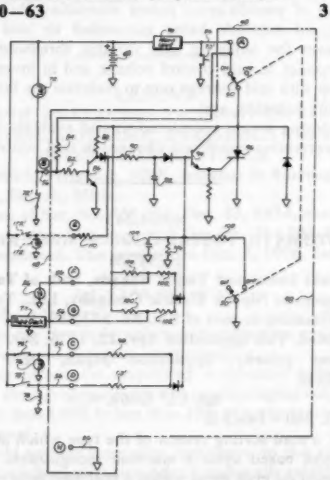
discriminating circuit means responsive to predetermined ones of said plurality of defect sensing means for preventing said control circuit means from producing a control signal by which said warning element is made to provide a less bothersome warning whenever one of said predetermined defect sensing means senses a defect.

4,034,337

VEHICLE ALARM APPARATUS

Don E. Haddock, deceased, late of North Augusta, S.C. (by Joan L. Haddock, administratrix), assignor to Electronic Devices, Inc., Augusta, Ga.

Filed Sept. 9, 1975, Ser. No. 611,667
Int. Cl.² B60R *25/10*; H01H *53/06*
U.S. Cl. 340—63 **3 Claims**



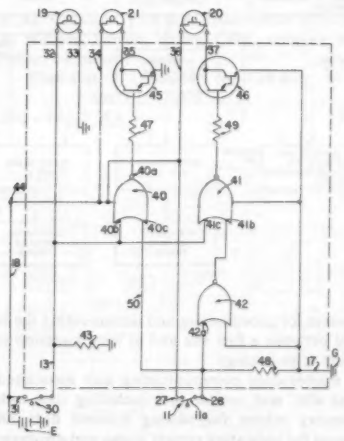
1. For use in a vehicle having a battery connected in circuit with a horn means operated by a normally open horn switch, with a first vehicle accessory component connected by a first existing vehicle circuit directly to ground and having a normally open operating switch connected between said first component and a terminal post of said battery, with a second vehicle accessory component connected by a second existing vehicle circuit directly to said battery terminal and having a normally open operating switch connected between said second component and ground, and with a third vehicle accessory component having a casing thereof connected by a third existing vehicle circuit to ground; the improvement comprising an alarm device having a plurality of connecting points, and a plurality of lead lines formed with selectively attachable means connected, respectively, to said horn means circuit, to said first existing vehicle circuit at a point between said first accessory component and said operating switch therefor, to said second existing vehicle circuit at a point between said second accessory component and said operating switch therefor, and to said third existing vehicle circuit at a point between said third electrical component and grounds, said alarm device including control circuit means operable to close an operating circuit between said battery and said horn in response to a first full voltage circuit condition when said operating switch for said first component is closed, in response to a grounded circuit condition when said operating switch for said second component is closed, or in response to an open circuit condition when said circuit between said third electrical component and ground is broken.

4,034,338

OPERATING CONDITION SIGNAL LIGHT FOR AN AUTOMOTIVE VEHICLE

Leno L. Bevilacqua, 1132 Upland Drive, Columbus, Ohio 43220

Filed Nov. 4, 1975, Ser. No. 628,756
Int. Cl.² B60Q *1/26*
U.S. Cl. 340—66 **5 Claims**



1. An automotive vehicle signal light system comprising:

A. a plurality of visually distinguishable electric lamps positionable on a vehicle for observation from a position relatively rearward of the vehicle, and

B. a control circuit having an output connected with said electric lamps and operable for energization of a selected one of said electric lamps in accordance with predetermined vehicle operating conditions, said control circuit including;

1. a first input connectable with an electrical power source suitable for energization of said lamps,

2. a second input connectable with the vehicle's brake system and responding to actuation thereof in provid-

ing a signal to the control circuit resulting in energization of a first one of said lamps,

3. a pressure responsive electrical switch connected in the control circuit for effecting energization of a second one of said lamps in response to application of a pre-determined compressive force to said switch and effecting energization of a third one of said lamps when said pre-determined compressive force is not applied to said switch, said switch adapted for mounting on a surface of the vehicle's accelerator pedal in fixed relationship thereto and responding to application of a pre-determined compressive force by the vehicle operator in actuating the accelerator, and

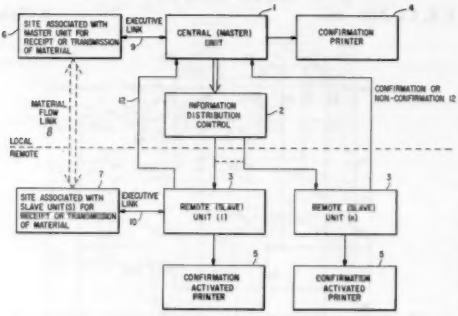
4. interlock circuit means preventing energization of either said second or third lamps when actuation of the brake system has energized said first lamp and preventing energization of said third lamp when said second lamp is energized.

4,034,339

SYSTEM FOR COORDINATION AND DOCUMENTATION OF MATERIAL HANDLING

John Marshall Free, Montclair, and Charles William Jeunelot, Wayne, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 28, 1976, Ser. No. 681,109
Int. Cl.² G06F *3/02*
U.S. Cl. 340—146.1 C **11 Claims**



1. System for coordinating and documenting the handling of material between a first site and at least a second site remote therefrom, comprising:

a. a master data communicating unit associated with the first site, said master unit including data entry means, memory means for storing entered data and display means for indicating system status and displaying the data entered in said memory means; and

b. a slave unit associated with the second site, said slave unit being operatively connected to said master unit and including means for displaying data entered into said master unit, means for indicating confirmation/non-confirmation of the data displayed by said slave unit display means and means for effecting a permanent record of the data displayed by said slave unit display means and also the output of said confirmation/non-confirmation indicating means,

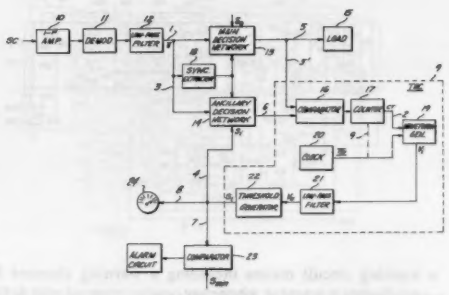
whereby data entered in the master unit is simultaneously displayed by the respective display means of said master and slave units and confirmation/non-confirmation of said entered data is displayed by both units.

4,034,340

SYSTEM FOR DETERMINING THE QUALITY OF TRANSMISSION OF INCOMING DIGITAL MESSAGE SIGNALS

Marcello Sant'Agostino, Gattinara (VC), Italy, assignor to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

Filed June 8, 1976, Ser. No. 693,869
Claims priority, application Italy, June 10, 1975, 68487/75
Int. Cl.² H03K *13/32*
U.S. Cl. 340—146.1 R **8 Claims**



1. A system for determining, at a receiver for digital message signals, the quality of transmission of said signals, comprising:

input means for obtaining incoming message signals from a transmission channel;

a first and a second decision network connected in parallel to said input means, said first network having a fixed threshold of relatively low absolute value for discriminating between different signal levels in a predetermined range, said second network having a variable threshold of relatively high absolute value for discriminating between signal levels in the same range;

a utilization circuit connected to the output of said first network;

comparison means connected to the outputs of said first and second networks for emitting a pseudo-error pulse in response to any discrepancy between said outputs;

evaluation means connected to said comparison means for producing a control voltage representative of the average rate of pseudo-error pulses emanating therefrom, said second network being connected to said evaluation means for adjusting said variable threshold thereof in response to said control voltage and in inverse relationship with said average rate to maintain the latter substantially constant; and

monitoring means connected to said evaluation means for ascertaining significant changes in said control voltage.

4,034,341

AUTOMATIC POSTAL-CODE-NUMBER READING SYSTEM

Tomoyuki Isono, and Toshio Nakada, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 533,559, Dec. 17, 1974, abandoned. This application Apr. 22, 1976, Ser. No. 679,405
Claims priority, application Japan, Dec. 17, 1973, 48-142240
Int. Cl.² G06K *9/04*
U.S. Cl. 340—146.3 H **7 Claims**

1. In a mail sorting system of the type which automatically sorts mail based upon a machine recognizable postal code positioned on mail items within a specified field of characters grouped in words, the improvement comprising a pre-scanning means for detecting the word end positions of words in

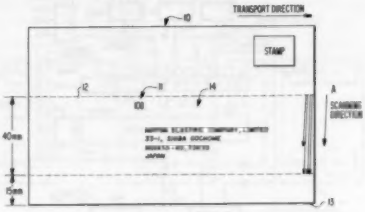
said field and distinguishing which of said word end positions constitute the positions of said postal code, said pre-scanning means comprising

a. optical scanner means for scanning said field and developing video bits corresponding to presence of characters instantaneously scanned,

b. shift register means, receiving said video bits, for storing said video bits temporarily in the order received,

c. word end masking means, responsive to the condition of video bits in selected stages of said shift register means, for generating a word end signal when the said condition of video bits satisfies preset criteria indicative of a word end being scanned,

d. height masking means, responsive to the condition of video bits in several selected combinations of stages of said shift register means, for generating height detection signals indicative of the height of a character scanned and stored in said shift register means,



e. mask signal generating means responsive to said word end signal and said height detection signals for providing a mask signal indicative of the detection of the front or rear end of a word and the height of the character at the detected end of said word,

f. scan position determining means for continuously developing signals representing the coordinate position of said scan within said field, said scan position determining means being responsive to said mask signal for outputing the coordinate position signals of said detected word end, and

g. position determining means, connected to receive all mask signals and coordinate position signals developed during the scan of a field, for selecting the coordinate position signals satisfying a set of predetermined conditions as the coordinate position signals of said postal code.

4,034,342
MAGNETIC CHARACTER RECOGNITION SYSTEM EMPLOYING A DYNAMIC THRESHOLD VOLTAGE DETERMINATION SYSTEM

Karlis Kruklitis, Plymouth, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 535,361, Dec. 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 394,293, Sept. 4, 1973, abandoned. This application Oct. 7, 1976, Ser. No. 730,431

Int. Cl.[2] G06K 9/00

U.S. Cl. 340—146.3 AG **3 Claims**

1. A dynamic threshold voltage determination system of a character recognition system comprising:

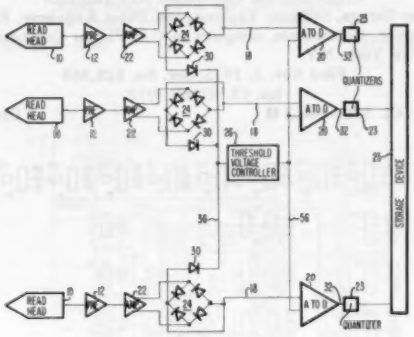
amplifying means for amplifying a dynamic information signal, the signal having an information signal range from greater than 150% to less than 25% of a nominal information signal;

a threshold voltage controller responsive to the amplified dynamic information signal for dynamically establishing a threshold voltage signal proportionate to the amplified dynamic information signal, the threshold voltage signal being established for a substantially uniform duration within the information signal range;

said voltage controller including:

a current control device responsive to a predetermined amount of the amplified dynamic information signal; and

linear operating means for allowing the linear operation of said current control device within the information signal range; and



first comparator means for comparing the voltage level of the amplified dynamic information signal with the voltage level of the threshold voltage signal, said first comparator means producing output pulses of substantially uniform width throughout said information signal range in response to the threshold voltage signal of substantially uniform duration.

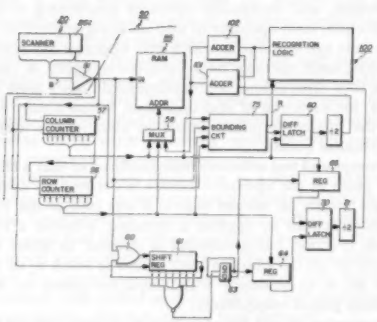
4,034,343
OPTICAL CHARACTER RECOGNITION SYSTEM

Michael E. Wilmer, Portola Valley, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 1, 1976, Ser. No. 728,666

Int. Cl.[2] G06K 9/12

U.S. Cl. 340—146.3 MA **12 Claims**



1. A character recognition system adapted for use with a facsimile scanner for sampling the reflectivity of a document medium comprising:

memory means connected to said scanner for storing at corresponding address locations thereof the corresponding sampled reflectivity signals of said document medium;

isolation means operatively connected to said scanner for isolating in the output thereof the coordinates of a character on said document medium; and

pattern generating means connected to compare selected ones of said reflectivity signals in said memory means

against a predetermined set of character patterns transposed by said character coordinates of said isolating means, said generating means including selected test points in said set of patterns combined in a logical OR to accommodate statistical variations in said isolated character.

4,034,344

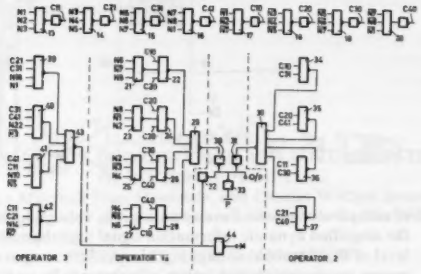
CHARACTER THINNING APPARATUS

Peter Saraga, Salfords, England, and Pieter Reijnierse, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,089

Int. Cl.² G06K 9/12

U.S. Cl. 340—146.3 H **4 Claims**



1. Character rewriting apparatus for use in recognizing binarized characters made up of points on a matrix of regular rows and columns, comprising:

machine means for applying a compound operator in predetermined cycles to each point of the binarized character on a first matrix, said compound operator having an operative center surrounded by a sub-matrix of points defining an operative area fitting said first matrix; and

machine means for rewriting, in each one of said predetermined cycles ones of said character points to which said compound operator is applied into corresponding positions on a second matrix in accordance with a predetermined compound test criterion applied by said compound operator, said compound operator comprising a set of operators, each operator of said set being applied to all of the four orientations in which said operator fits said first matrix, each operator being adapted to apply, in each of said four orientations, a predetermined binary logic function, for each one of said operators, to the binary values of the character points found in coincidence with the sub-matrix points,

said compound test criterion being defined so that a character point at the operative center is omitted by said machine means on second matrix if any one of the binary logic functions so applied is satisfied, wherein a binary logic function being satisfied is defined as when those points in the operator defined herein as black or as white are all in coincidence with character points or background points respectively;

each operator of said set of operators having sides of three operator points parallel to said rows and columns, said compound operator comprising:

a. all operators of a first kind having at least two but not more than five black points forming a chain of adjacent black points occupying not more than two adjacent sides of the operator, and

b. all operators of a second kind having at least five but not more than seven black points forming a chain of adjacent black points occupying three sides of the operator, all remaining points in the operators of both kinds being white, and the operators of the second kind having an additional external adjacent black point when applied in at least two of the adjacent orientations in which said operator sub-matrix fits said matrix points, said additional black point being located on the center of the side remote from the side having a central white point.

4,034,345

MICROPROGRAMMABLE COMPUTER DATA TRANSFER ARCHITECTURE

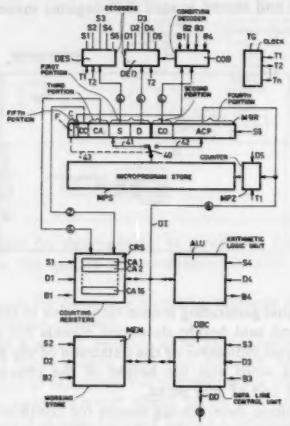
August Deis, Eiserfeld, Sieg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,162

Claims priority, application Germany, Aug. 23, 1974, 2440390

Int. Cl.² G06F 9/00

U.S. Cl. 364—200 **9 Claims**



1. A microprogrammable computer comprising

a microprogram store for storing micro-instructions;

a micro-instruction register connected to said micro-program store, having first, second, third, fourth, and fifth portions;

means for serially transferring information from said micro-program store to said micro-instruction register;

a microprogram counter connected to said microprogram store;

a clock pulse generator having an output connected to said microprogram counter;

an internal data line connected to said fourth portion of said micro-instruction register;

a working store for storing data comprising a data source and a data sink connected to said internal data line;

an arithmetic logic unit connected to said internal data line for performing arithmetic/logic operations on data supplied by said data source;

a counting register group comprising a plurality of addressable registers connected to said internal data line, having an input connected to said third portion of said micro-instruction register for addressing one of said plurality of registers;

a first decoder having a first input connected to said first portion of said micro-instruction register for controlling said data source, a second input connected to said clock pulse generator, and an inhibit input;

a second decoder having a first input connected to said first portion of said micro-instruction register for controlling said data sink, and a second input connected to said clock pulse generator; and

a third decoder having a first input connected to said third portion of said micro-instruction register, a second input connected to a single bit location of said micro-instruction register, condition inputs, and an output connected

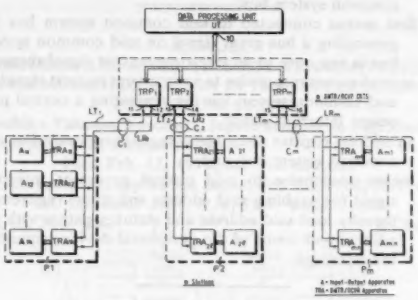
to said inhibit input of said first decoder for generating an inhibit signal for inhibiting data transfer from said data source to said data sink.

4,034,346

INTERFACE FOR ESTABLISHING COMMUNICATIONS BETWEEN A DATA-PROCESSING UNIT AND A PLURALITY OF STATIONS

Claude Hostein, Avrille, France, assignor to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Filed Oct. 15, 1975, Ser. No. 622,466
Int. Cl.² G06F *3/00*
U.S. Cl. 364—900 **19 Claims**



1. An interface for connecting a data-processing unit to a group of *m* working stations formed by items of data emitting and receiving apparatus, the unit and each of the items of apparatus transmitting and receiving binary data in parallel characters in response to control signals which are generated in the unit, said characters being transmitted and received in series, comprising *m* transmitter/receiver circuits associated with the *m* stations and a transmitter/receiver circuit associated with each item of apparatus, each transmitter/receiver circuit including means for:

a. converting a parallel, input character supplied to it into a sequence of bits forming a series output character, and

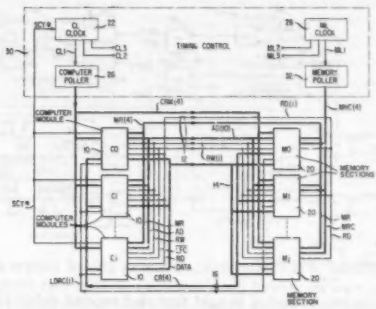
b. converting sequential input bits forming a series-character into a parallel output character, means for selectively supplying a parallel output character from the unit as a parallel input character to each of the station transmitter/receiver circuits, means for selectively supplying a parallel output character at each station transmitter/-receiver circuit associated with a particular station as a parallel input character to the unit, each transmitter/-receiver circuit including two terminals adapted to be connected to first and second transmission lines forming a channel associated with each station, one of said terminals coupling a series output character from the transmitter/receiver circuit to the first transmission line, the other terminal coupling a series input character from the second transmission line to the transmitter/receiver circuit, means for supplying a parallel output character of each apparatus transmitter/receiver circuit associated with a particular item of apparatus as a parallel input character to the item of apparatus associated with the apparatus transmitter/receiver circuit, means for supplying a parallel output character of the particular item of apparatus associated with each apparatus transmitter/receiver circuit as a parallel input character to the apparatus transmitter/receiver circuit associated with the particular item of apparatus, said first and second transmission lines respectively coupling a series output character terminal from the circuit associated with a particular station to a series input character terminal of each apparatus transmitter/receiver circuit at that station and a series output character terminal of each apparatus transmitter/receiver circuit at a station to a series input character terminal of the circuit associated with that staton.

4,034,347

METHOD AND APPARATUS FOR CONTROLLING A MULTIPROCESSOR SYSTEM

Geoffrey Probert, Jr., Broomfield, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 8, 1975, Ser. No. 603,178
Int. Cl.² G06F *13/00, 15/16*
U.S. Cl. 364—200 **27 Claims**



1. A multiprocessing system comprising:

a plurality of computers,

a plurality of memory sections,

a time multiplexed bus system interconnecting said computers with said memory sections,

computer polling means for repetitively and sequentially polling said computers to determine whether any one of said polled computers currently, requires access to any one of said memory sections,

computer gating means responsive to a determination that a polled computer currently requires said access for connecting said polled computer over said bus system to said one memory section for a time interval controlled by said computer polling means,

means in said polled computer for transmitting service request information to said one memory section over said bus system during said time interval,

memory polling means for repetitively and sequentially polling said memory sections to determine whether any one of said polled memory sections currently requires access to any one of said computers, said memory polling means being asynchronously operated with respect to said computer polling means,

memory gating means responsive to a determination that a polled memory section currently requires access to one of said computers for connecting said polled memory section over said bus system to said one computer for a time interval controlled by said memory polling means, and

means for transmitting information over said bus system between said polled memory section and said one computer during said last named time interval.

4,034,348

APPARATUS, INCLUDING DELAY MEANS, FOR SAMPLING AND RECOVERING DATA RECORDED BY THE DOUBLE TRANSITION RECORDING TECHNIQUE

Donald J. Rathbun, Andover, Mass., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 28, 1976, Ser. No. 700,276
Int. Cl.² G06F *7/28;* H03K *5/00*
U.S. Cl. 364—200 **19 Claims**

1. Apparatus for sampling data from an information stream

of clock and data bits, said information stream having a first frequency, said apparatus comprising:

A. a first delay element;

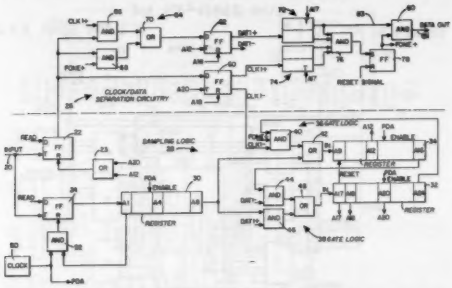
B. a second delay element;

C. wherein both said first and second delay elements have an input and an output;

D. means for coupling the output of said first element to the input of said second element;

E. means for receiving said stream of bits at the input of said first element;

F. means for generating a stream of system clock signals having a frequency which is greater than said first frequency;



G. means, included in said first and second delay elements and responsive to said clock signals, for enabling said clock and data bits of said information stream to be passed through said first and second elements;

H. wherein said frequency of said clock signals is set so that no more than one bit, regardless of kind, is passing through either of said first or second elements at any given time;

I. means, included in said second element, for indicating that one of said bits is substantially midway in its passing through said second element; and

J. means, responsive to said means for indicating, for sampling whether another one of said bits has been received by said first element.

4,034,349

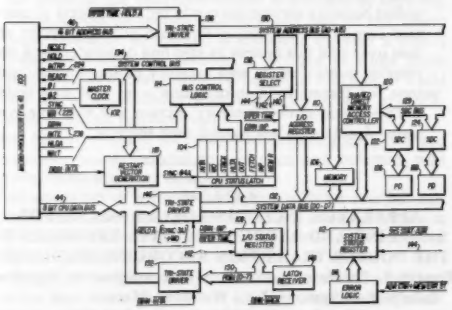
APPARATUS FOR PROCESSING INTERRUPTS IN MICROPROCESSING SYSTEMS

Robert F. Monaco, Jeffersonville, and Nicholas Derchak, Hatfield, both of Pa., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Jan. 29, 1976, Ser. No. 653,409

Int. Cl.² G06F *3/04, 9/18*

U.S. Cl. 364—200 **11 Claims**



1. A data processor system comprising:

a central processor including means for executing a sequence of instructions;

memory means for storing instructions and data;

a peripheral device including means for generating a peripheral device interrupt signal when communication between said central processor and said peripheral device is desired;

a common system bus connected to said central processor and said memory means;

control means connected to said common system bus for controlling said peripheral device;

said control means including means responsive to a peripheral device interrupt signal for placing an interrupt request signal on said common system bus, and means responsive to a bus grant signal on said common system bus for simultaneously placing the status and address of the peripheral device requesting an interrupt on said common system bus;

first means connected to said common system bus for generating a bus grant signal on said common system bus in response to an interrupt request signal thereon;

second means responsive to an interrupt request signal on said common system bus for generating a central processor interrupt signal;

an address register and a status register connected to said common system bus; and,

means responsive to said central processor interrupt signal for enabling said address and status registers to thereby load said address and status registers with the address and status of the peripheral device requesting the interrupt.

4,034,350

INFORMATION-TRANSMITTING APPARATUS

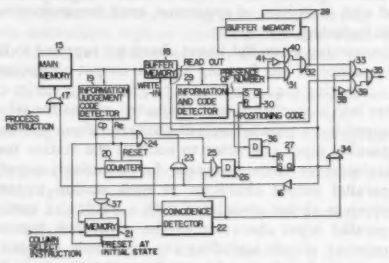
Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1975, Ser. No. 631,915

Claims priority, application Japan, Nov. 15, 1974, 49-131643

Int. Cl.² G06F *7/34*

U.S. Cl. 364—900 **5 Claims**



1. An information-transmitting apparatus comprising:

a source of a series of data records separated from each other by record positioning codes, each record including a plurality of data words separated from each other by word positioning codes, each word including a plurality of digits;

first memory means coupled to said source for successively storing the words of a series of records one after another;

coincidence detection means coupled to said first memory means for comparing respective digits of a given word included in a given record stored in said first memory means with the respective digits occupying corresponding data positions of a word arranged in the same sequential position in another succeeding record; and

control means coupled to said coincidence detection means for controlling the data transmission, said control means having an output and including means for stopping the delivery to said output of those of said digits of said succeeding record occupying the respective compared posi-

tions in words of said succeeding record having the same sequential position in the given record which indicate coincidence as the result of the comparison carried out by said coincidence detection means, and for delivering to said output only:

i. those of the digits of said succeeding record which do not coincide with corresponding digits of said given record;

ii. any other digits of said word of said succeeding record following said noncoincidence digits regardless of whether or not coincidence is detected as the result of comparison; and

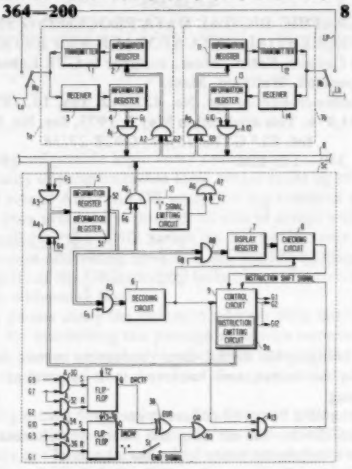
iii. all of said record positioning and word positioning codes.

4,034,351

METHOD AND APPARATUS FOR TRANSMITTING COMMON INFORMATION IN THE INFORMATION PROCESSING SYSTEM

Fumihiko Takezoe, Kawasaki, Japan, assignor to Fuji Electric Company Ltd., Kawasaki, Japan

Filed Feb. 12, 1976, Ser. No. 657,662
Claims priority, application Japan, Feb. 12, 1975, 50-17628
Int. Cl.² G06F *3/04, 7/10, 9/19;* G08B *11/00*
U.S. Cl. 364—200 **8 Claims**



1. In an information processing system of the type having a plurality of widely dispersed stations connected in cascade via a communications link, a method of collecting and disseminating common data, said method comprising,

a. dispatching from an optional one of said stations an information word containing at least an instruction part and a data part, said instruction part containing a search instruction, said information word being dispatched in a manner to travel to said stations consecutively via said communications link and return to said dispatching station,

b. receiving said information word with said search instruction at each said station in operating condition, and inserting common data existing at said station into the data part of said information whereby the data part becomes loaded with common data from said operating stations including said dispatching station, and

c. altering the instruction portion of said information word after it has its data part loaded with common data from all said operating stations including said dispatching station and sending said altered information word to said stations via said link for registration of said common data, and

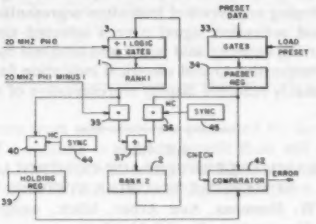
d. at each said station, receiving said information word with said altered instruction portion, detecting said altered instruction portion and registering the common data contained in said information word.

4,034,352

PHASE CONTROL OF CLOCK AND SYNC PULSER

LaVerne C. Hotchkiss, Greensboro, N.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 20, 1976, Ser. No. 659,885
Int. Cl.² G06F *1/00*
U.S. Cl. 364—200 **3 Claims**



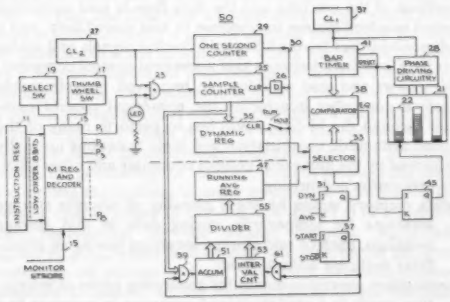
1. In a system having gating circuitry which is to feed information from two different sources each having its own independent timing clocks into a processing device; the improvement comprising sync means connected to the gating circuitry so as to cause both sources to enter processing means at the same time; an additional gate device having an input connected to one of said sources and an output; comparator means having two inputs and an output; one input of said comparator being connected to the output of said additional gate device and the other input being connected to the other one of said sources; said sync means being fed to said additional gate device so as to time the receipt of the information to said comparator in accordance with the sync timing; said comparator producing an error output when its two inputs are not synchronized; and sync correcting means having a control input connected to the output of said comparator.

4,034,353

COMPUTER SYSTEM PERFORMANCE INDICATOR

William Michael Denny, Santa Barbara; Russell Louis Hagen, Goleta, and Steve Ka-Lai Leung, Santa Barbara, all of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 613,326, Sept. 15, 1975, Pat. No. 4,001,699. This application Oct. 29, 1975, Ser. No. 626,963
Int. Cl.² G06F *11/00*
U.S. Cl. 364—200 **15 Claims**



12. A computer performance indicator for use in conjunction with a computer having a monitor instruction capability comprising:

detecting means for detecting occurrence of an initial monitor instruction and a terminal monitor instruction in the computer program and for providng a representation of at least a predetermined portion of each such detected instruction at the output thereof;

decoding means coupled to the output of said detecting means for decoding said initial monitor instruction to produce a display activation signal, and for decoding said terminal monitor instruction to remove said display activation signal, said display activation signal representing a time-related parameter indicative of the performance of a predetermined operation of said computer occurring between said initial and terminal monitor instructions;

means coupled to the output of said decoding means for developing an electrical indication representing the state of said activation signal over a selected time interval occurring between said initial and terminal monitor; and

means responsive to said electrical indication for providing a humanly readable display representative of said indication.

4,034,354

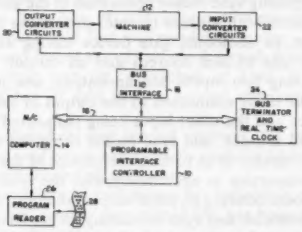
PROGRAMMABLE INTERFACE CONTROLLER FOR NUMERICAL MACHINE SYSTEMS

Richard W. Simmons, Ann Arbor, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Nov. 21, 1975, Ser. No. 634,299

Int. Cl.² G05F *19/18, 11/18;* G06F *3/04*

U.S. Cl. 364—900 **18 Claims**



1. In combination with a numerical control machine system operative to perform a series of instructions in accordance with a prepared program, said numerical control machine system comprising, a machine for performing the program instructions in response to control signals, sensors detecting the status of selected operational parameters of the machine for generating status data indicative of the present state of the selected operational parameters, a program reader for converting the prepared program into instruction data, a numerical control computer having storage means storing data including said instruction data and said status data and computation means for generating control signals controlling the operation of the machine and the data flow in said numerical control machine system in response to said stored data, and a bi-directional bus transmitting said control signals and status data back and forth between said numerical control computer, said sensors and said machine, an improved programmable interface controller interfacing the numerical control computer through the bi-directional bus to perform many of the routine arithmetic computation and logic functions normally performed by the numerical control computer and other auxiliary processors comprising:

data memory means having a plurality of discrete storage locations for temporarily storing data in said storage locations, each of said storage locations having an identifying multi-bit address field;

instruction generator means for generating series of instruction words in a predetermined sequence in response to a start signal, each of said instruction words comprising an operation code specifying one of a plurality of data manipulation operations to be performed and a address field specifying a specific storage location in said memory means;

instruction processor means for performing said plurality of data manipulation operations in response to said series of instruction words, said instruction processor means sequentially performing arithmetic logic in response to said operational code with the data received from the storage location specified by said companion address field to generate processed data and transferring said processed data back to said data memory means where it is stored in the storage location specified by said companion address field; and

master control means interfacing said bi-directional bus for controlling the transfer of data from storage locations in the numerical computer's storage means to storage locations in said data memory means in response to a first control signal generated by the numerical computer, and generating said start signal each time new data transfer has been completed, and for transferring said processor data from said data memory means to said computers storage means in response to a second control signal after all the instructed operations to be performed by the instruction processor have been completed.

4,034,355

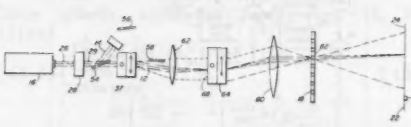
HOLOGRAPHIC DIGITAL DATA PROCESSING SYSTEM WITH SEQUENTIAL DATA STORAGE AND RETRIEVAL

W. John Carlsen, Natick, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 432,912, Jan. 14, 1974, Pat. No. 3,891,976. This application May 5, 1975, Ser. No. 574,479

Int. Cl.² G11C *13/04;* G02B *27/38*

U.S. Cl. 340—173 LM **15 Claims**



1. A holographic digital data processing system in which data may be stored and retrieved in a sequential manner comprising

a source of a beam of coherent energy,

a beam divider for dividing the beam of coherent energy into a reference beam and a data beam,

a modulator for impressing a bit of digital data on at least one of the beams of coherent energy,

a first beam deflector which deflects the data beam by a first preselected angle selected from a first matrix array of angles,

means for by-passing the first beam deflector with the reference beam to establish a unique spatial relationship between the data beam and the reference beam,

a second beam deflector which deflects both the data beam and the reference beam by a second preselected angle selected from a second matrix array of angles,

a recording medium in which a hologram may be formed,

means for focussing the data beam and the reference beam into the recording medium so that the data beam and the reference beam interfere and form a hologram of the bit of digital data in the recording medium, the second preselected angle determining the position of the hologram in the recording medium and the first preselected angle determining the angle of intersection of the data beam and the reference beam at the recording medium whereby the hologram of the bit of digital data has a unique address within the recording medium and may be stored in the recording medium in a sequential manner,

means for selectively occluding the reference beam before reaching the recording medium so that only the data

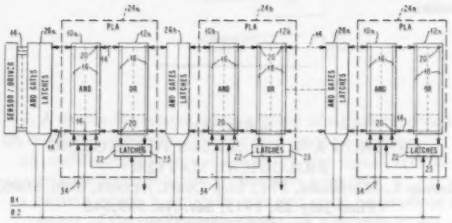
beam is directed onto the recording medium at the hologram of the bit of digital data thereby forming an image of the single bit of digital data beyond the recording medium at a fixed location defined by the reference beam when the hologram is recorded, and

a photodetector located at the image of the bit of digital data so that the image bit of digital data located at a particular address in the recording medium may be retrieved individually in a sequential manner.

4,034,356
RECONFIGURABLE LOGIC ARRAY

Frank E. Howley, Poughkeepsie, N.Y.; John W. Jones, Winchester, England, and Joseph C. Logue, Poughkeepsie, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,261
Int. Cl.² G11C *11/36*
U.S. Cl. 340—173 R **2 Claims**



1. A reconfigurable logic array comprising:

a plurality of programmable logic arrays made up of latches and sets of AND and OR arrays having common addressing lines that extend through all sets of arrays with inputs supplied to the AND arrays on lines transverse to said common addressing lines and the latches coupled to the outputs of the OR arrays on lines transverse to said common addressing lines;

gating means along the common address lines between the sets for controlling the passage of signals between sets;

latching means on said addressing lines between the sets for storing bits of data transmitted along said addressing line; and

clocking means for opening and closing said gating means at different time periods whereby the sets of AND and OR arrays can be connected and disconnected as necessary to perform logic functions.

4,034,357
PATTERNS FOR USE IN THE FIELD ACCESS PROPAGATION OF A BUBBLE LATTICE

Kay Beharat Mehta, and Otto Voegeli, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 15, 1975, Ser. No. 604,978
Int. Cl.² G11C *11/02*
U.S. Cl. 340—174 TF **11 Claims**

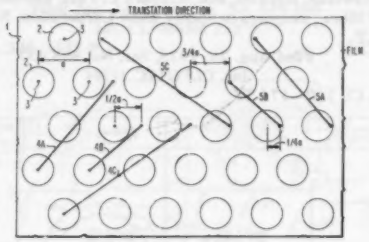
1. The combination of a bubble lattice and a rotating field access pattern suitable for the translation of bubbles, said pattern comprising:

a. a first set of substantially parallel oblong magnetizable elements having a first end positioned on a lattice point and a second end positioned a distance of about 0.5 lattice constant in the direction of translation from a different lattice point, and

b. a second set of substantially parallel oblong magnetizable elements being oriented substantially perpendicular to said elements of said first set,

said elements of said second set having a first end positioned a distance of about 0.25 lattice constant in the direction of translation from a lattice point and a second end positioned a distance of about 0.75 lattice constant in the direction of translation from a different lattice point,

said elements of said first and second sets being distributed over the translation area of said bubble lattice wherein

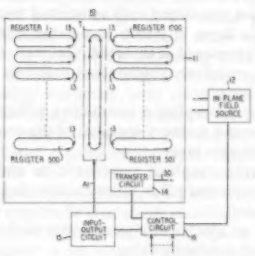


the forces from said elements generated by the application of a rotating in-plane magnetic field will combine with the magnetostatic bubble-bubble interaction forces in the lattice to move the bubble lattice system.

4,034,358
MAGNETIC BUBBLE DEVICES WITH CONTROLLED TEMPERATURE CHARACTERISTICS

Stuart Lawrence Blank, Madison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 25, 1975, Ser. No. 607,378
Int. Cl.² G11C *11/02*
U.S. Cl. 340—174 TF **2 Claims**

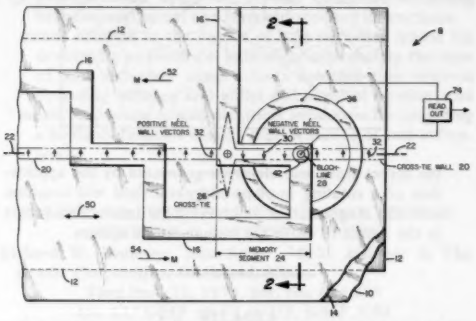


1. A magnetic bubble device comprising (a) a substrate supporting at least a first layer of an iron containing garnet possessing a uniaxial magnetic anisotropy perpendicular to the layer, which layer is capable of supporting magnetic bubbles which are stable and of a characteristic diameter in a temperature varying bias field over a temperature range, which anisotropy is predominantly a growth induced anisotropy produced by dodecahedral site substitution, which bias field is produced by a magnet adapted for maintaining the layer in the bias field throughout the temperature range, which bias field is less than a bubble collapse field at each temperature within the temperature range, and which bias field varies throughout the temperature range at an average variation rate (b) generating means for generating the bubbles; and (c) propagating means for moving the bubbles in order to produce information processing characterized in that the iron garnet is of a composition represented by the atomic formula: $R_{3-a}(Ca,Sr-)_aGe_aFe_{5-a}O_{12}$, where R is at least one member of the group consisting of yttrium and the rare earth elements between numbers 57 and 71 of the Periodic Table of the Elements, wherein the Ge occupies octahedral sites in a relative molar concentration of from 0.01 to 0.1 per formula unit such that the bubble collapse field of the garnet varies with temperature at approximately the said average variation rate.

4,034,359
MAGNETO-RESISTIVE READOUT OF A CROSS-TIE WALL MEMORY SYSTEM USING A PILLAR AND CONCENTRIC RING PROBE

Ernest J. Torok, St. Paul; Alan D. Kaske, Minneapolis; John A. Krawczak, Hopkins, and Maynard C. Paul, Bloomington, all of Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Aug. 28, 1975, Ser. No. 608,437
Int. Cl.² G11C *11/44*
U.S. Cl. 340—174 TF **4 Claims**



1. In a cross-tie wall memory system in which bits of binary data are stored as inverted Neel wall sections, which inverted Neel wall sections are bounded by a cross-tie on one end and by a Bloch-line on the other end, in a cross-tie wall in a magnetizable layer having magneto-resistive properties and an easy axis and in which said binary data are serially propagated along said cross-tie wall by the intersecting fields provided by associated drive lines, which drive lines have memory segments that are associated with associated memory cells in said magnetizable layer in which associated ones of said bits of binary data are stored as inverted Neel wall sections, a method of magneto-resistively reading out said bits of stored binary data comprising:

conductively coupling a conductive pillar to the Bloch-line position in a memory segment of the cross-tie wall in said magnetizable layer;

conductively coupling, concentric to and separated from said conductive pillar, a conductive ring to said magnetizable layer;

coupling an electrical signal across said conductive pillar and said conductive ring;

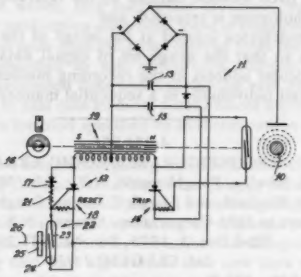
determining the resistance in said magnetizable layer between the opposing concentric edges of said conductive pillar and said conductive ring as an indication of whether or not a Bloch-line is stored in said memory segment.

4,034,360
SYSTEM FOR DISABLING THE RESET CIRCUIT OF FAULT INDICATING MEANS

Edmund O. Schweitzer, Jr., 1002 Dundee Road, Northbrook, Ill. 60062

Filed Aug. 6, 1976, Ser. No. 712,281
Int. Cl.² G08B *21/00*
U.S. Cl. 340—253 A **8 Claims**

1. Fault indicating means responsive to flow of fault current in an electrical distribution system comprising: indicator means movable from one position to another position on flow of fault current in said system, a trip circuit responsive to flow of fault current in said system to shift said indicator means from said one position to said other position, a reset circuit to shift said indicator means automatically back to said one position on restoration of said system to normal operating condition; and manually operable means for disabling said

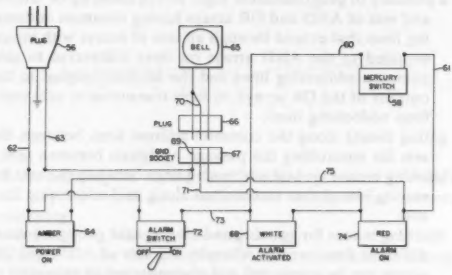


reset circuit to maintain said indicator means in said one position.

4,034,361
METHOD AND APPARATUS FOR STORING BIOLOGICAL MATTER

Thomas L. Mortensen, 5742 Falk Court, Arvada, Colo. 80002

Filed July 28, 1975, Ser. No. 599,648
Int. Cl.² G08B *21/00*
U.S. Cl. 340—272 **10 Claims**



1. In apparatus for sensing weight loss of a cryogenic fluid employed as a coolant in a biological storage container wherein there is provided a balance assembly including a fixed frame, a balance beam pivotally mounted on said fixed frame and movable between a first location on one side of a reference plane and a second location on an opposite side of said reference plane, the combination therewith of:

means including a receiving platform responsive to the weight of the container and its contents to urge said beam into said first location when the weight of the container and its contents is at or above a predetermined level and counterweight means for urging said beam into said second location in response to a predetermined weight loss of the container and its contents such that the total weight is reduced below the predetermined level,

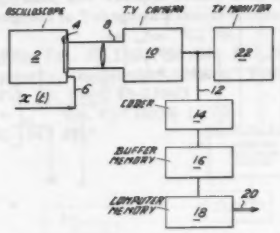
an electric alarm circuit which is connectable to an electric power source, including terminal means for electrically connecting a remote alarm into said alarm circuit and alarm monitoring means for monitoring effective electrical connection of a remote alarm into said alarm circuit, and

sensing means in said alarm circuit responsive to movement of said beam to said second location indicating a weight reduction of the container and its contents below the predetermined level for energizing said alarm circuit.

4,034,362
DEVICE FOR AUTOMATIC PROCESSING OF SIGNALS RECORDED ON AN OSCILLOSCOPE SCREEN

Charles Balanca, Corbreuse, and Gilbert Charles, Chatillon-sous-Bagneux, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 6, 1976, Ser. No. 655,958
Claims priority, application France, Feb. 18, 1975, 75.05021
Int. Cl.² G06F 3/00
U.S. Cl. 340—347 AD 5 Claims



1. A device for automatic processing of signals recorded on an oscilloscope screen, wherein said device comprises:

an oscilloscope screen scanned by the signal $x(t)$ to be recorded as a function of the time interval t,

a camera which is optically adjusted so as to produce the image of the oscilloscope screen on a storage target,

a unit for electron scanning of said storage target in which the scan consists of a series of lines which are parallel to each other and perpendicular to the time axis of the image $x'(t)$ of the signal $x(t)$ on said storage target, said lines being such as to correspond to the scanning of the point of impact of an electron beam on said target, and for producing for each line a signal $y(\tau)$ containing a profile of the intersection of the electron beam with the image $x'(t)$ of the signal $x(t)$ on the storage target, the parameter τ being such as to vary between 0 and its maximum value in the case of each line,

electronic means for associating with each line, in a line address counter, a line address n which varies from 1 to N,

a coder responsive to said line address counter and to said signals $y(\tau)$ for associating with each line address n in a word-address counter a raw word address m which varies between 1 and M at each instant of appearance of said respective signals $y(\tau)$ from which at least one final word address m is to be obtained for recording in paired association with the line address n, said coder including also electronic means for comparing the signal $y(\tau)$ with a series of threshold values having increasing amplitudes S_1, $S_2 \ldots S_i \ldots S_k$, means responsive to said comparing means for generating signals of constant amplitude $M_i(\tau) = AY[y(\tau) - S_i]$ where Y is the step function having an amplitude equal to 1 when and only when:

$$y(\tau) - S_i \geq 1$$

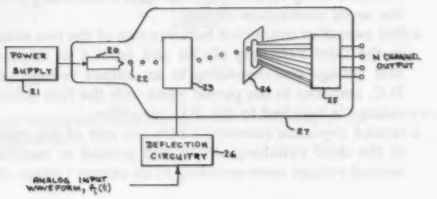
A being a coefficient of proportionality which is independent of the parameter, means responsive to said signals $M_i(\tau)$ for selecting the nonzero signal $M_i(\tau)$ which corresponds in the case of each signal $y(\tau)$ to the maximum threshold value of S_i and means for calculating in response to each said selected signal $M_i(\tau)$ the final word address m by reference to the value of the time parameter τ corresponding to the half-sum of the values of τ which are associated with the leading edge and with the trailing edge of the selected signal $M_i(\tau)$, and

means for recording sequentially the pairs of addresses (n, m) on a digital memory.

4,034,363
REAL TIME DATA RATE QUANTIZER AND ANALOG-TO-DIGITAL CONVERTER SYSTEM

Paul Van Etten, Clinton, and John V. McNamara, Rome, both of N.Y., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 14, 1976, Ser. No. 649,106
Int. Cl.² H03K 13/00
U.S. Cl. 340—347 P 3 Claims



1. A real time large data rate quantizer and analog-to-digital converter for an input analog wave form being comprised of an electron gun providing an electron beam of high constant energy, a mosaic target of electron beam sensitive detectors arranged in annular rings, said mosaic target having a preselected number of sectors, each sector being in the form of a wedge shaped piece, each sector including a preselected number of segments, each segment being a separate electron beam sensitive device, each sector corresponding to a specific time interval of said input analog signal and each segment corresponding to a finite range in amplitude of said input analog waveform, vertical and horizontal deflection circuitry means connected to said vertical and horizontal deflection structure, respectively, and operating in combination therewith to provide a rotating beam impinging in the form of a spot of preselected size on said mosaic target in a circular pattern, said vertical and horizontal circuitry means receiving said input analog waveform to provide an increasing diameter of said circular pattern in accordance with an increasing magnitude of said input analog waveform, said vertical and horizontal circuitry means including a power splitter receiving said input analog waveform and providing first and second split signals, a deflection oscillator, a quadrature coupler connected to said deflection oscillator and providing first and second oscillator deflection signals therefrom, first and second amplitude modulators, said first amplitude modulator receiving said first split signal and said first oscillator deflection signal, said second amplitude modulator receiving said second split signal and said second oscillator deflection signal, said first and second amplitude modulators providing first and second deflection signals to said vertical and horizontal deflection plates, respectively, and a vacuum envelope for said electron gun, said vertical and horizontal deflection structure and said mosaic target.

4,034,364
ANALOG-DIGITAL CONVERTER

Takeo Fukuda, Yokohama, and Isao Tashiro, Kawasaki, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Nov. 12, 1975, Ser. No. 631,051
Claims priority, application Japan, Dec. 10, 1974, 49-141178
Int. Cl.² H03K 13/02
U.S. Cl. 340—347 NT 8 Claims

1. An analog-digital converter comprising:

a D.C. amplifier;

a first voltage-current converter connected to an input terminal of the D.C. amplifier,

a feed-back capacitor connected between the input terminal of the D.C. amplifier and an output terminal of the D.C. amplifier,

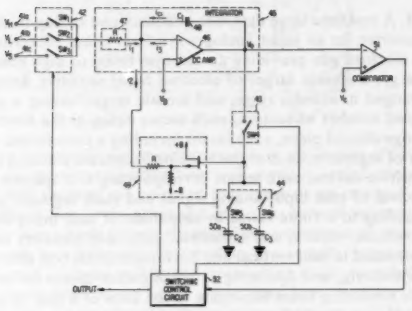
a first switching circuit for supplying an unknown analog voltage to be converted and first and second analog reference voltages having the same polarity as that of the converted voltage to the first voltage-current converter,

a serial connection circuit of a second switching circuit and a second voltage-current converter connected between the output terminal of the D.C. amplifier and the input terminal of the D.C. amplifier,

a third switchng circuit having two switches with one of the switches being connected to an inter-connecting point of the serial connection circuit;

a first capacitor connected between one of the two switches in the third switching circuit and ground to maintain a first voltage corresponding to an output voltage of the D.C. amplifier in the period when only the first reference voltage is supplied to the D.C. amplifier,

a second capacitor connected between one of the switches in the third switching circuit and ground to maintain a second voltage corresponding to an output voltage of the



D.C. amplifier during the period when only the second reference voltage is supplied to the D.C. amplifier,

a comparator for producing an output signal when the levels of the output voltage of the D.C. amplifier are equal to the level of a reference voltage and

a switch control circuit for controlling the first, second and third switching circuits to maintain the first and second voltages corresponding to the output voltages of the D.C. amplifier respectively in the first and second capacitors, to supply a first combined voltage of the second voltage corresponding to the output voltage of the D.C. amplifier and the unknown analog voltage to be converted to the D.C. amplifier for a predetermined period, to supply a second combined voltage of the first voltage corresponding to the output voltage of the D.C. amplifier and the second reference voltage to the D.C. amplifier and to obtain a digital quantity of the unknown analog voltage to be converted by measuring the period in which the second combined voltage is supplied to the D.C. amplifier.

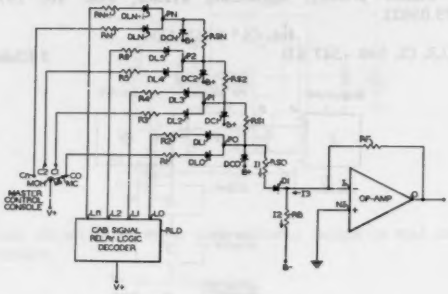
4,034,365

MOST RESTRICTIVE DIGITAL TO ANALOG CONVERTER

Reed H. Grundy, Murrysville, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.

Filed May 27, 1975, Ser. No. 581,222
Int. Cl.² H03K *13/00*
U.S. Cl. 340—347 DA **4 Claims**

1. A most restrictive digital to analog converter comprising, an integrated circuit operational amplifier having a first and a second input signal and an output, a degenerative feedback path coupled between said output and said first input, said second input coupled to a reference potential, said first input is also connected to a source of biasing voltage and is coupled to a series of current-limiting resistors by series diode, each of said series current-limiting resistors connected to a separate one of a first bank of series resistors and diodes and also connected to a separate one of a second bank of series resistors and diodes, a separate clamping diode connected between each one of said current-limiting resistors and the common point of said separate ones of said series resistors and diodes of said first and said second banks, each of said series resistors



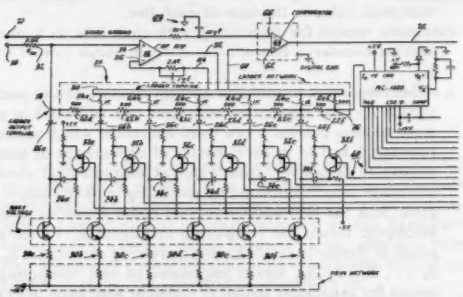
and diodes of said first bank selectively connected to a first digital input means, and each of said series of resistors and diodes of said second bank selectively connected to a second digital input means so that said integrated circuit operational amplifier produces an output signal in accordance with which one of the first or second digital input means is the most restrictive.

4,034,366

ANALOG-TO-DIGITAL CONVERTER WITH CONTROLLED LADDER NETWORK

John Memishian, Jr., Arlington, Mass., assignor to Analog Devices, Inc., Norwood, Mass.

Filed Jan. 28, 1976, Ser. No. 653,235
Int. Cl.² H03K *13/02*
U.S. Cl. 340—347 AD **16 Claims**



1. In a digital-to-analog converter including a current-dividing resistor network comprising a plurality of interconnected resistors with an output terminal and a common terminal; a set of switchable current sources connected to respective junction points of said resistor network in such manner that the network serves to divide the currents of the switched-on sources between said output terminal and said common terminal to produce at said output terminal a network output signal signifying which current sources are on;

the improvement in such converter which comprises:

an operational amplifier having two input terminals;

means connecting the output of said operational amplifier to said network common terminal; and

negative feedback means connecting said network common terminal to an input terminal of said operational amplifier, said amplifier output supplying current to said common terminal to drive its potential to the potential of the

other input terminal independently of which of said current sources is switched on.

4,034,367

ANALOG-TO-DIGITAL CONVERTER UTILIZING A RANDOM NOISE SOURCE

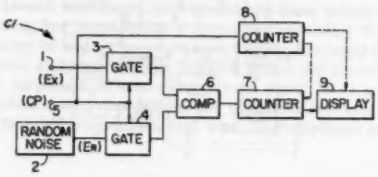
Takashi Sugiyama, and Takashi Tsuda, both of Musashino, Japan, assignors to Yokogawa Electric Works, Ltd., Tokyo, Japan

Filed Feb. 20, 1975, Ser. No. 551,283

Claims priority, application Japan, Feb. 28, 1974, 49-23900; Feb. 28, 1974, 49-23903

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 AD 9 Claims



1. An analog-to-digital converter for converting an input analog signal into an output digital signal, comprising:

reference random noise source means for generating random noise signals at a rate of uniform occurrence probability density in a given range;

means for generating a triangular wave signal having an amplitude greater than the minimum amplitude increment of said random noise signal;

a feed wire and return wire across which the analog signal to be converted is applied;

amplitude comparator means for repeatedly comparing the amplitude of said random noise signal with that of the signal appearing on said feed wire and for supplying first output pulses in accordance with the comparisons, and for repeatedly comparing the amplitude of said random noise signal with that of the signal appearing on said return wire and for supplying second output pulses in accordance with the comparisons, the triangular wave signal being effectively superposed on one of the signals to be compared prior to the comparisons, and

means responsive to the difference between the numbers of the first and second output pulses obtained from said amplitude comparator means to provide a digital output corresponding to the value of said analog signal to be converted.

4,034,368

NUMERICAL DISPLAY ELEMENT

Jun Shimomura, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

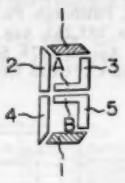
Filed Jan. 20, 1976, Ser. No. 650,786

Claims priority, application Japan, Jan. 27, 1975, 50-12167[U]

Int. Cl.² G09F *9/32*

U.S. Cl. 340—378 R 2 Claims

1. In a numerical display comprising seven segments, the improvement resides in that the horizontally extending central segment of said seven segments is divided into two parallel upper and lower segments connected to upper and lower right hand segments respectively to provide two substantially L-



shaped segments, whereby said numerical display is formed by six segments.

4,034,369

CHECK CIRCUIT FOR CHECKING VEHICLE WARNING SYSTEM

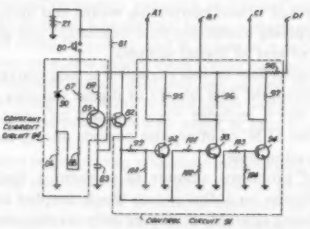
Kou Tanigawa; Kenzo Hashikawa, both of Kobe, and Jun Ota, Toyota, all of Japan, assignors to Fujitsu Ten Ltd., Kobe and Toyota Jidosha Kogyo Kabushiki Kaisha, both of, Japan

Filed Nov. 24, 1976, Ser. No. 744,612

Claims priority, application Japan, Nov. 28, 1975, 50-143105

Int. Cl.² G08B *19/00*

U.S. Cl. 340—52 F 6 Claims



1. A check circuit for checking a vehicle warning system, said vehicle warning system having a plurality of sensors each positioned at a corresponding one of a plurality of operating elements of a vehicle, the integrity of which elements is to be supervised, a plurality of warning devices each provided for a corresponding one of the sensors and controlled in operation by an abnormality detection signal from the corresponding one of the sensors, and a priority sequence judging circuit connected between the sensors and the warning devices for determining the degree of importance of detection signals from the sensors and preferentially providing an output to the warning devices in accordance with the priority of greatest importance, said check circuit comprising

simulating circuit means for artificially creating the same condition as that obtained when the sensors detect abnormalities to actuate all the warning devices; and

delay circuit means connected to the simulating circuit means and coupled to the warning devices for releasing said condition in accordance with a predetermined sequence at predetermined time delays whereby the integrity of the warning devices is checkable, item by item, in accordance with said sequence.

4,034,370

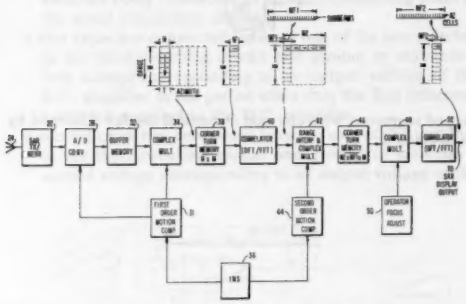
SECOND ORDER MOTION COMPENSATOR FOR HIGH RESOLUTION RADAR

James H. Mims, Linthicum, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 283,263, Aug. 23, 1972, abandoned. This application Apr. 6, 1976, Ser. No. 674,181

Int. Cl.² G01S 9/02

U.S. Cl. 343—5 CM 12 Claims



6. Apparatus for digitally providing motion compensation for vehicle maneuverability in a synthetic aperture radar coupled to the navigational system of said vehicle and including a transmitter and receiver section which respectively transmit and receive a sequence of N radar pulses during a predetermined coherent integration time period and converts the return pulses into a respective number of I&Q analog video signals, the combination comprised of:

means coupled to said receiver section for converting each of said I&Q analog video signals into M complex digital range samples;

first order motion compensation means, coupled to and receiving information from said navigationaly system, connected to said converting means and including means for applying a selective time translation and phase shift to each of said M digital samples;

a first digital data memory coupled to said converting means for storing M data blocks of digital samples where each data block includes time samples covering a selected number of N′ of interpulse periods during said coherent integration time;

a digital processor adapter to perform a time-frequency decimation on a digital data block coupled to said memory, being operable to sequentially receive each of said M data blocks and resolve each data block into a plurality of frequency bands which corresponds to NF1 synthetic subbeams;

second order motion compensation means, coupled to and receiving information from said navigational system, connected to said digital processor and including means for applying another selected time translation and phase shift to each frequency band;

a second digital data memory coupled to said second order motion compensation means for storing digital data samples for M × NF1 synthetic subbeams for a selected number N2 time intervals and feed out sequential data blocks of M × N2 into data samples; and

a second digital processor adapted to perform a time-frequency decimation process on a data block coupled to said second memory, being operable to sequentially receive each data block therefrom and resolve each said data block into a plurality of frequency bands in the azimuth direction which correspond to motion compensated range cells adaptable for utilization by a synthetic aperture radar display unit.

4,034,371

APPARATUS AND METHODS FOR DIFFERENTIATING BETWEEN SYNCHRONOUS AND ASYNCHRONOUS RESPONSE SIGNALS IN SECONDARY RADAR DEVICES

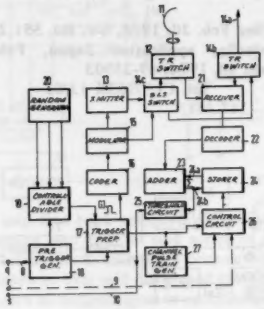
Bruno Maier, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation-in-part of Ser. No. 461,741, April 17, 1974, abandoned. This application Apr. 28, 1975, Ser. No. 572,519

Claims priority, application Germany, May 21, 1973, 2325617

Int. Cl.² G01S 9/56

U.S. Cl. 343—6 R 5 Claims



1. A secondary radar device in which the interrogation pulse repetition rate is derived from the pulse repetition rate of a primary radar device comprising a variable controllable frequency divider a pulse generator supplying pulse repetition rate pulses to said primary radar and to said variable frequency divider, a random generator also connected to said variable frequency divider, a trigger preparation device connected to the output of said variable frequency divider so that the interrogation pulse repetition frequency of the secondary radar for the interrogation signal changes continuously with the divider ratio, a memory control circuit, said trigger preparation circuit connected to key said secondary radar transmitter and emitting an indicator impulse to said memory control when an interrogation signal is transmitted, a storer connected to said memory control and storing information, an adder connected to said storer, a decoder connected to the receiver of said secondary radar and supplying to said adder the decoded answer signals, said storer under the control of said memory control and storing decoded answer signals from said adder in synchronism with the timing of the interrogation signals triggered by the trigger preparation circuit so that nonsynchronous answer signals are suppressed and that synchronous ones are admitted, and a threshold circuit connected to said storer, a presentation means connected to said threshold circuit and receiving an output signal from said storer only when a threshold value is exceeded by the stored answer signals.

4,034,372

VELOCITY GATE HAND-OFF SYSTEM

Donald Lee Margerum, Woodland Hills, Calif., assignor to Northrop Corporation, Los Angeles, Calif.

Filed July 12, 1976, Ser. No. 704,645

Int. Cl.² G01S 9/56, 7/36

U.S. Cl. 343—6.8 R 10 Claims

1. In a vehicle carrying a target to be launched therefrom for firing upon by a doppler radar guided missile; means for modifying the radar return signal from the carrier vehicle comprising:

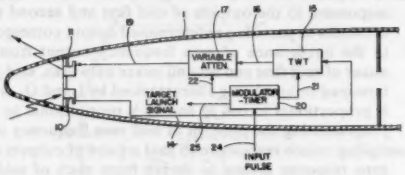
a. receiving antenna means in said carrier for receiving the radar signals of the missile radar system;

b. signal amplifying means for amplifying said received radar signals;

c. transmitting antenna means in said carrier for transmitting radar return signals;

d. means for feeding said radar signals from said amplifying means to said transmitting antenna means;

e. means for launching said target from said carrier vehicle; and



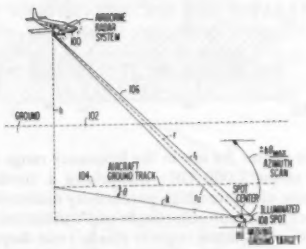
f. modulator-timer means responsive to an input command to launch said target, said modulator-timer means comprising first ramp function means for increasing the frequency of said radar return for a first predetermined time period and second ramp function means for attenuating the amplitude of said radar return signal for a second predetermined time period, said time periods overlapping so that said frequency is high when said amplitude is low.

4,034,373

AIRBORNE MOVING-TARGET INDICATING RADAR SYSTEM

Richard de Pierre, W-Boxford; Gilbert Jerome Forgays, Lowell; Hans Heinrich Behling, Bedford, and William Childs Curtis, Lexington, all of Mass., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 8, 1973, Ser. No. 413,808
Int. Cl.² G01S 9/42
U.S. Cl. 343—7.7 **16 Claims**



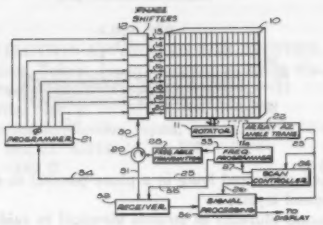
1. In a radar system located on a first body moving at a relatively high velocity with respect to a second body which is spaced a distance from said first body, said radar system including transmitting, antenna and receiving means for illuminating a spot of said second body having a first size with a transmitted beam of exploratory pulses of wave energy and receiving reflected wave energy therefrom; the improvement therein in which said receiving means includes means for detecting moving targets located on said second body within said illuminated spot which targets include those having a radar cross section size many orders of magnitude smaller than said first size and moving with respect to said second body at a velocity which is more than an order of magnitude smaller than said relatively high velocity.

4,034,374

SEQUENTIAL LOBING TRACK-WHILE-SCAN RADAR

Bradford E. Kruger, Woodland Hills, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,151
Int. Cl.² G01S 9/02
U.S. Cl. 343—16 R **10 Claims**



1. An angle tracking system for a track-while scan pulsed radar, comprising:

a pencil-beam-forming array capable of providing inertialess scan in at least a first scanning coordinate as a function of the frequency of RF energy applied thereto;

first means for mechanically rotating said array to scan said beam in said first coordinate, including angle transducer means for continuously providing a mechanical scan angle identifying signal;

second means including a pulsed, frequency-agile transmitter, a receiver and duplexing means for energizing said array with RF pulses and for receiving corresponding target echoes, the variations of frequency of said RF pulses providing a superimposed scan in said first scanning coordinate;

third means responsive to a first control signal for generating a pulsed frequency program to control said second means to transmit a sequential lobing pattern of N pulses at a first radio frequency and N pulses at a second radio frequency on a time shared basis within each of N successive transmitter pulses, said first and second frequencies corresponding to first and second beam positions overlapping by a first predetermined angle in said first coordinate;

fourth means responsive to said angle indentifying signal for generating said first control signal and for programming said first control signal to effect repetition of the lobe sequencing provided by said third means to provide third and fourth beam positions overlapping by a second predetermined angle in said first coordinate, said fourth means also being operative to program said first control signal to produce a quiescent transmitter period between the end of said N transmitted pulses from said second means corresponding to said first and second beam positions and the beginning of N transmissions corresponding to said third and fourth beam positions;

and fifth means responsive to the relative amplitudes of received signals at each of said beam positions and to said angle identifying signal for generating a value corresponding to the estimated angular position of a given target.

4,034,375

LAMINATED CAMOUFLAGE MATERIAL

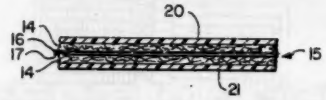
Erik W. Wallin, Gamleby, Sweden, assignor to Barracudaverken Aktiebolag, Djursholm, Sweden

Filed May 23, 1975, Ser. No. 580,403
Int. Cl.² G01V 1/40; B32B 5/12
U.S. Cl. 343—18 A **5 Claims**

1. A flexible web having radar defeating characteristics for use in camouflage material comprising: a first non-woven,

flexible layer of electrically nonconductive polymeric material; a second non-woven, flexible material of electrically non-conductive polymeric material; and a third layer lying between said first and second layers for imparting partial radar reflective characteristics to said web, said third layer comprising

a first plurality of strands containing electrically conductive fibers in generally discontinuous relationship, said strands arranged in parallel irregularly spaced relationship with



each other and lying in a plane parallel to said first and second layers,

a second plurality of strands identical to said first strands arranged in parallel irregularly spaced relationship with each other and lying in a plane parallel to said first and second layers, said sets of strands in said third layer being disposed to form a plurality of parallelogram-shaped openings;

said first and second layers being bonded to said third layer and to each other through said openings.

4,034,376

RADIO DIRECTION FINDER WITH ARRAY ELEMENT SIGNAL PROCESSING

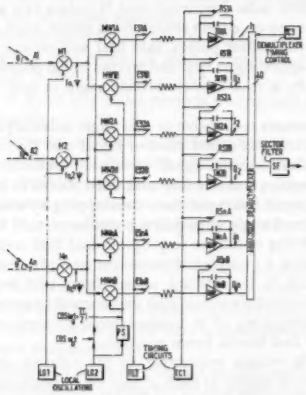
Paul Barton, Bishops Stortford, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed July 22, 1976, Ser. No. 707,844

Claims priority, application United Kingdom, July 24, 1975, 30975/75

Int. Cl.² G01S *3/02*

U.S. Cl. 343—112 R **10 Claims**



1. Radio direction finding equipment for deriving information respecting the angular position of a mobile craft with respect to said equipment from radio frequency pulses signals emanting from said craft, comprising:

antenna means having *n* elements responsive to said emanating pulses to produce a series of *n* contemporaneons pulse signals to equal frequency and with phase difference ψ between successive signals of said series determined by the angle of arrival of said pulses from said mobile craft;

a first mixing network including *n* first mixers each responsive to a corresponding one of said antenna elements and to a first phase of a local oscillaton providing a local oscillaton signal at substantially the same frequency as that of said emanating pulse signals;

a second mixing network including *n* second mixers each responsive to a corresponding one of said antenna elements and to a second phase of said local oscillaton, said second phase being substantially at $\pi/2$ radians with respect to said first oscillaton phase;

zero response means providing *n* pairs outputs and being responsive to the outputs of said first and second mixing networks to provide predetermined output corresponding to the occurrance of zero frequency output from each mixer of said first and second mixer networks, said predetermined output being characterized by I_j and Q_j, where I_j is proportional to cos $j\psi$ and Q_j is proportional to sin $j\psi$, *j* representing the position of said zero frequency output;

sampling means responsive to said *n* pairs of outputs of said zero response means to derive from each of said pairs outputs in the form $I_j Q_j - I_j - Q_j$;

and signal processing means for processing the *n* output pairs of said sampling means to determine therefrom the value of said ψ which is the phase difference of said emanating signal between successive elements of said antenna means and characterizes said angle of arrival of said pulses from said mobile craft.

4,034,377

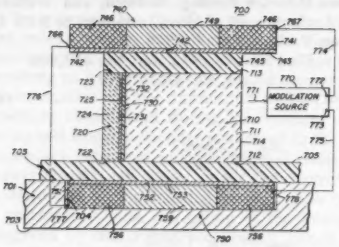
FERRITE CIRCULATORS AND ISOLATORS AND CIRCUITS INCORPORATING THE SAME

Robert M. Knox, La Grange, and Peter P. Toulios, Westchester, both of Ill., assignors to Epsilon Lambda Electronics Corporation, Batavia, Ill.

Filed Feb. 17, 1976, Ser. No. 658,412

Int. Cl.² H04L *5/14*; H04B *1/48*; H01P *1/36*, *1/38*

U.S. Cl. 343—180 **43 Claims**

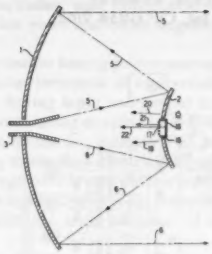


1. A circulator for use in the frequency range from about 1 GHz to about 1,000 GHz comprising a conductive image plane, three elongated high permittivity dielectric waveguides of finite cross section adjacent to said conductive image plane, a thin film of synthetic organic plastic resin disposed between and secured to both said image plane and said waveguides, said thin film being low loss in character having a low permittivity compared with that of said dielectric waveguide, the ratio between the thickness of said thin film and the square root of the cross-sectional area of said dielectric waveguides being in the range from about 0.02 to about 1.0, said waveguides being arranged in an equiangular Y-shape and integrally connected at a common junction and each including a port, a ferrite cylinder in said waveguide junction and having the axis of said ferrite cylinder disposed essentially normal to said image plane, and means for establishing a magnetic field in said ferrite cylinder extending essentially normal to said image plane, whereby microwave energy in said frequency range inserted in a first port is essentially all transmitted with little attenuation to a second part and essentially none transmitted to the third port.

4,034,378
ANTENNA WITH ECHO CANCELLING ELEMENTS

Edward Allen Ohm, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 21, 1975, Ser. No. 597,366
Int. Cl.² H01Q 19/12
U.S. Cl. 343—781 CA 8 Claims



1. An antenna having a main reflector, a subreflector and a feed system so arranged that radiation from said feed system is successively reflected from said subreflector and said main reflector, said antenna further having an essentially flat plate mounted near said subreflector so as to reflect some of said radiation back toward said feed system,

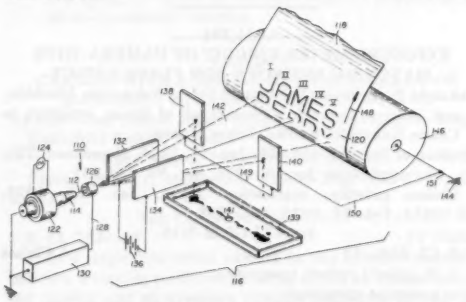
wherein the improvement comprises frequency sensitive reflector means comprising a grid of intersecting conductors located between said feed system and said plate near said plate and operating so that a first component of said radiation is reflected from said plate and a second component of said radiation is reflected by said frequency sensitive reflector means, said frequency sensitive reflector means and said plate presenting approximately equal areas to said radiation,

whereby radiation from said feed system reflected back to said feed system by said subreflector is substantially cancelled in a first and a second frequency range by said first and second reflected components combined.

4,034,379
INK JET WRITING PROCESS AND APPARATUS

James M. Berry, Deerfield, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed Nov. 13, 1972, Ser. No. 306,104
Int. Cl.² G01D 15/18
U.S. Cl. 346—1 28 Claims



1. In a writing process wherein electrically charged elements from a stream are deflected electrostatically in a span between an issuing member and a carrier for records for producing thereon a pattern, the steps in producing a line on the carrier comprising:

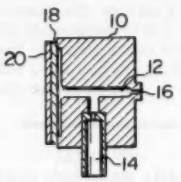
directing the charged elements in a first succession to a plurality of positions, respectively, at each of a succession of stations on said carrier, each station spaced from and aligned with the others; and

directing the charged elements, respectively, in a second succession to a plurality of sites at said stations, respectively, and in the same sequence as corresponding drops in the first succession, each site spaced from and in alignment with the others and located at a place different from the position at its station.

4,034,380
INK EJECTION APPARATUS FOR PRINTER

Takuro Isayama, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Apr. 6, 1976, Ser. No. 674,187
Claims priority, application Japan, Apr. 8, 1975, 50-42620
Int. Cl.² G01D 15/18; H01V 7/00
U.S. Cl. 346—140 R 8 Claims



1. Ink ejection apparatus, comprising:

an ink ejection head defining an ink chamber and an ejection orifice communicating with the ink chamber;

an electrostrictive member defining part of the ink chamber;

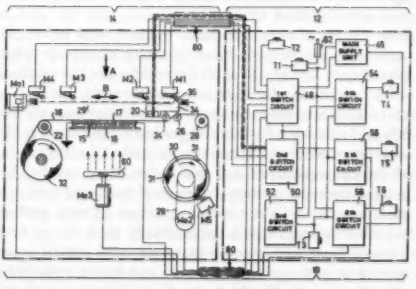
a pulse generator to feed a pulse to the electrostrictive member to cause reduction of a volume of the ink chamber; and

sensor means to detect oscillation of the electrostrictive member during a duration of the pulse and produce an electrical signal in response thereto that indicates whether there is sufficient ink in the ink chamber.

4,034,381
THERMOPLASTIC RECORDING APPARATUS

Roland Moraw, and Günther Schädlich, both of Naurod, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sept. 24, 1975, Ser. No. 616,760
Claims priority, application Germany, Sept. 27, 1974, 2446208
Int. Cl.² G03G 16/00; G01D 15/10
U.S. Cl. 346—151 32 Claims



1. A recording apparatus for recording information on a

photoconductive thermoplastic recording medium comprising:

transporting means for feeding said recording medium to and removing it from an exposure station for image-wise exposure of said information onto said recording medium,

an exposure station including a heatable rostrum means,

means for supporting said recording medium at said exposure station,

means for charging said recording medium,

carriage means for transporting said charging means across said recording medium thereby charging said recording medium,

heating means for the control of the time of heating of said rostrum means,

means for moving said carriage means, and

means for delaying exposure at said exposure station by a delay time interval to permit vibrations in said apparatus from said transported carriage to substantially diminish.

4,034,382

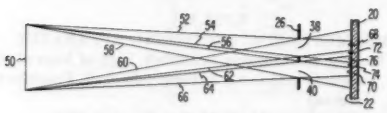
APPARATUS FOR FORMING A COLOR TELEVISION PICTURE TUBE SCREEN

Harold Bell Law, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 217,885, Jan. 14, 1972. This application Aug. 25, 1975, Ser. No. 607,488

Int. Cl.² G03B *41/00*

U.S. Cl. 354—1 **6 Claims**



1. A light exposure apparatus for the formation of a striped phosphor screen on the panel portion of a color picture tube including a striped color selective electrode having a plurality of slits comprising:

a light source assembly including a light emitter, a reflector and a collimating member;

a base for supporting the panel portion of a color picture tube and the striped color selective electrode with the plurality of slits in a predetermined positional relationship with respect to said light source assembly; and

a correction lens disposed between said light source assembly and said base for causing paths of light from said light source assembly to approximate paths of electron beams in the color picture tube, said collimating member having a light emitting portion facing said base and said correction lens; said light emitting portion of said collimatng member being shaped substantially in a linear form as viewed from said base so that said light source assembly serves as a linear light source, and being oriented such that the length of said linear light emitting portion is in the direction of the length of the slits in the striped color selective electrode.

4,034,383

EXPOSURE CONTROL DEVICE

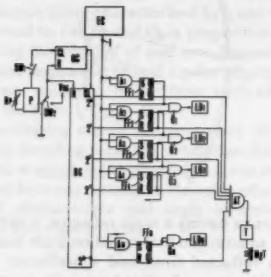
Yukio Mashimo, Tokyo; Tadashi Ito, Yokohama; Nobuhiko Shinoda, Tokyo; Nobuaki Sakurada, and Fumio Ito, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1975, Ser. No. 570,503

Claims priority, application Japan, Apr. 23, 1974, 49-45814; Apr. 23, 1974, 49-45815

Int. Cl.² G03B *9/62*

U.S. Cl. 354—23 D **16 Claims**



1. An exposure control circuit comprising:

a. a shutter screen containing a shutter front screen and a shutter rear screen;

b. a shutter time control circuit, containing:

1. a pulse forming circuit to form pulses with prescribed constant cycle,

2. a computation circuit to compute pulses from said pulse forming circuit, and

3. a shutter control means to control the running of the shutter front screen and the shutter rear screen based on the computed value of said computation circuit;

c. a compensation circuit coupled to said computation circuit, wherein said compensation circuit is for reducing the number of pulses provided by said pulse forming circuit so as to transmit the same to said computation circuit; and

d. an insertion means to insert the amount of pulse reduction corresponding to the amount of overlapping of shutter screens into said compensation circuit as an analog electrical amount;

whereby the number of pulses are reduced based on the amount of overlapping of shutter screens and are transmitted to the computation circuit, and accordingly, shutter time is adjusted.

4,034,384

EXPOSURE METER CIRCUIT OF CAMERA WITH MATCHING NETWORK FOR FLASH DEVICE

Tokuichi Tsunekawa, Yokohama; Soichi Nakamoto, Machida, and Tetsuya Taguchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 434,448, Jan. 18, 1974, abandoned. This application June 9, 1975, Ser. No. 584,831

Claims priority, application Japan, Jan. 24, 1973, 48-10014; Feb. 28, 1973, 48-23938

Int. Cl.² G03B *7/16*

U.S. Cl. 354—33 **4 Claims**

1. A camera system comprising:

a. a storage capacitor;

b. a flash tube coupled to said storage capacitor for illuminating an object with a light energy corresponding to electric energy stored in the storage capacitor;

c. a transistorized detecting circuit coupled to the storage capacitor for producing a control signal corresponding to the level of stored electric energy, said transistorized detecting circuit having a control signal terminal for

transferring the control signal and a pair of driving voltage receiving terminals, a driving voltage receiving positive terminal of the transistorized detecting circuit being grounded through a switching means;

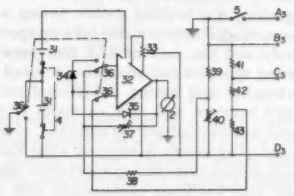
d. light sensitive means for producing a first electrical signal corresponding to the amount of light incident from the object to be photographed;

e. series-connected batteries, each having positive and negative electrodes, said connection of batteries having a connection point and outer negative and positive terminals;

f. amplifier means having power source terminals connected to the outer terminals of said series-connected batteries and also having input and output terminals;

g. an exposure meter coupled to the output terminal of said amplifier means for indicating an exposure value corresponding to the first electrical signal;

h. first change-over means connected with an input terminal of said amplifier means for coupling the light sensitive means with the input terminal of said amplifier means



upon the selection of the daylight photography mode and for coupling the control signal terminal of said detecting circuit with the input terminal of said amplifier means upon the selection of the flash photography mode;

i. a second change-over means connected to ground, the second change-over means being connected to said connection point of the series-connected batteries when the flash photography is selected and being connected to the outer negative terminal of the series-connected batteries when the daylight photography is selected; and

j. driving voltage supplying means having a pair of driving voltage supplying terminals, one of said pair of driving voltage supplying terminals being connected to the ground, and being connected to one of the pair of driving voltage receiving terminals, which terminal is connected to the driving voltage receiving positive terminal of the transistorized detecting circuit, while one of said pair of driving voltage supplying terminals is connected to the other of the pair of driving voltage receiving terminals and being connected to the outer negative terminal of the series-connected batteries.

4,034,385

CAMERA WITH A SINGLE AUTOMATICALLY OR MANUALLY OPERABLE MEMORY SWITCH

Akihiro Arai, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

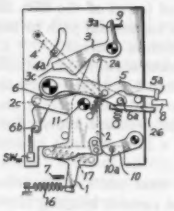
Filed May 3, 1976, Ser. No. 682,389

Claims priority, application Japan, May 15, 1975, 50-63715[U]

Int. Cl.² G03B 7/08, 19/12

U.S. Cl. 354—38 **11 Claims**

1. In a single lens reflex camera having a mirror movable between a viewing position extending across an optical axis of the camera and an exposure position displaced beyond the optical axis, light-responsive circuit means for providing an electrical quantity corresponding at least in part to lighting conditions, capacitor means for storing said electrical quantity, a single switch connected between said light-responsive circuit means and said capacitor means for transmitting said quantity from said light-responsive circuit means to said capacitor means when said switch is in a closed position and for placing said capacitor means in a condition storing said electrical quantity when said switch is in an open position, switch-control means cooperating with said switch for controlling the latter to have one or the other of said positions, and a pair of operating means cooperating with said switch-control means for operating the latter to have the switch in its open position



before the mirror moves from its viewing to its exposure position, one of said operating means being an automatic operating means for automatically operating said switch control means to determine the position of said switch automatically and the other of said operating means being a manual operating means accessible to the operator of the camera for manipulation for manually determining the position of said switch.

4,034,386

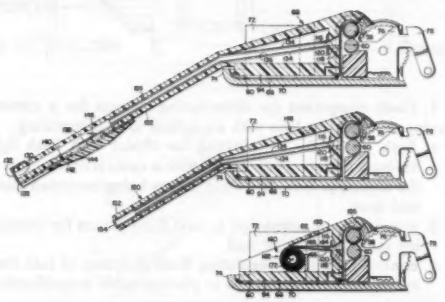
IMBIBITION CHAMBER ADAPTER FOR SELF-DEVELOPING CAMERA

Nicholas Gold, Arlington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 21, 1976, Ser. No. 679,048

Int. Cl.² G03B 17/50

U.S. Cl. 354—86 **9 Claims**



1. An adapter for providing a lighttight imbibition chamber on a self-developing camera of the type including pressure applying means between which a self-developing film unit is adapted to be advanced to distribute a fluid processing composition within the film unit, a housing section extending forwardly of the pressure applying means, a baffle plate mounted on the housing section forwardly of the pressure applying means of a bottom wall of the housing section and extending laterally between side walls thereof and being mounted for movement between an inoperative position in overlying relation to the bottom wall and a normal operative position wherein the baffle plate is inclined with respect to the bottom wall and extends rearwardly towards the pressure applying means so as to extend into the normal path of travel of a film unit emerging from the pressure applying means for deflecting the film unit from its path of travel to improve the uniformity of fluid distribution within the film unit and for guiding the film unit to a film exit slot in the bottom wall of the housing section, said adapter comprising:

a hollow base section configured to be operatively located in the camera housing section and including a bottom wall for engaging and depressing the baffle plate from its

operative position to its inoperative position and a trailing end wall adapted to be located in alignment with and adjacent to the pressure applying means;

means defining a film entry slot in said trailing end wall through which a film unit emerging from the pressure applying means enters said base section;

means adjacent said film entry slot and extending into the normal path of travel of the film unit for deflecting the film unit from its normal path to improve the uniformity of fluid distribution therein;

means on said base section for defining lighttight chamber for receiving and completely enclosing a film unit that has advanced into said base section and has become disengaged from the pressure applying means;

means defining a film exit slot in said lighttight chamber; and

means on said base section fro releasably coupling said adapter to the camera housing section;

4,034,387

APPARATUS FOR TAKING PHOTOGRAPHS OF AN OBJECT IN CLOSE PROXIMITY BY MEANS OF FLASH

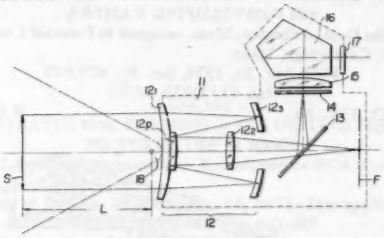
Shohei Ohtaki, Machida; Susumu Kozuki, Kawasaki, and Zenzo Nakamura, Urawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 390,712, Aug. 23, 1973, abandoned. This application Apr. 16, 1974, Ser. No. 461,420

Claims priority, application Japan, Aug. 28, 1972, 47-86064

Int. Cl.² G03B *15/02*

U.S. Cl. 354—126 **14 Claims**



1. Flash equipment for illuminating objects for a camera having an objective lens with an optical axis, comprising:

a. flash means for illuminating an object with flash light having a direction coincident with a central optical axis of the objective lens, said flash means being mounted along said axes;

b. circuit means connected to said flash means for energizing said flash means; and

c. control means for regulating flash duration of said flash means in correspondence to photographic magnification.

4,034,388

FILM TRANSPORT DRIVING AND BRAKING APPARATUS FOR A PHOTOGRAPHIC CAMERA

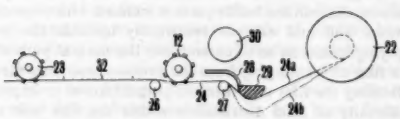
Tomonori Iwashita, Chofu, and Susumu Kozuki, Yokahama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed June 5, 1975, Ser. No. 583,971

Claims priority, application Japan, June 7, 1974, 49-64708

Int. Cl.² G02B *1/24*

U.S. Cl. 354—173 **5 Claims**



1. In a roll film camera including a camera body, an aperture plate having an exposure aperture therein located in said camera body, a long length film magazine including a magazine chamber removably combined with said camera body, wherein the improvement comprises a, transport driving and braking apparatus comprising, in combination:

a. a film supply shaft including shaft including a supply spool and a take up spool drive shaft including a take up spool each rotatable in the chamber of said magazine and positioned on the opposite sides of said exposure aperture for transporting film past said exposure aperture from the supply spool to the take up spool;

b. first driving means positioned in said magazine and connected to said take up spool drive shaft;

c. film advancing means positioned in said camera body for intermittently advacing said film past said exposure aperture, said film advancing means including a film advancing sprocket;

d. a take up spool located in said camera body between said film advancing sprocket and said take up spool in said magazine chamber, said take up spool in said camera body spaced from the path of the film between said film advancing sprocket and said take up spool in said magazine chamber;

e. second driving means positioned in said camera and operatively connected to said film advancing means; and

f. film guiding and braking means having a film guiding portion arranged between said take up spool in said camera body and the path of said film between said film advancing sprocket and said take up spool in said magazine chamber and having a frictional resilient portion arranged between said take up spool in said magazine chamber and said advancing sprocket, so that when said film advancing means is stopped while said first driving means is driving said take up spool drive shaft, said film is brought into frictional engagement with said frictional portion, whereby said film is braked so as not to impart any residual movement to the film behind said exposure aperture during exposure operation of said camera.

4,034,389

APPARATUS FOR DEVELOPING A TRAVELLING PHOTOGRAPHIC EMULSION CARRIER

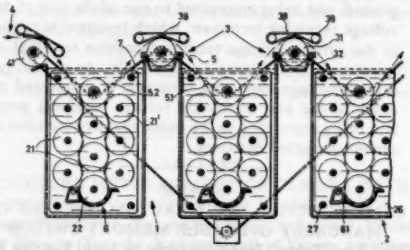
Heinrich Huss, Liebigstr. 1, 6051 Weiskirchen, Germany

Filed Sept. 22, 1975, Ser. No. 615,794

Claims priority, application Germany, Sept. 24, 1974, 2445503

Int. Cl.² G03D *3/08*

U.S. Cl. 354—322 **7 Claims**



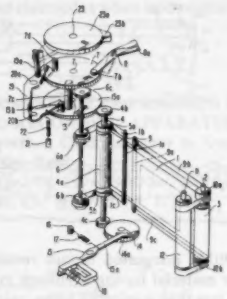
1. An apparatus for developing a travelling photographic emulsion carrier, comprising at least two laterally spaced apart containers having upper edges and being adapted to accommodate baths of treating liquid, emulsion carrier guide means in the respective containers and each comprising a plurality of guide rollers for guiding the carrier in a loop-shaped path having a bight, and a deflecting roller for deflecting the carrier in said bight, all of said rollers being located downwardly of the respective upper edges so as to be at least partially immersed in the respective bath, said guide rollers and deflecting roller in each of said containers being of identical diameters and being arranged in three rows in the respective container; a receptacle located intermediate said containers for accommodating a body of fresh water; and carrier transfer roller means at least partly immersed in the body of water and operative for engaging and transferring the carrier from one to the other of said containers.

4,034,390

MAGNET WARNING DEVICE FOR FOCAL PLANE ELECTRIC SHUTTER CAMERA

Fumio Urano, Omiya, and Tetsuji Shono, Ranzan, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 27, 1976, Ser. No. 680,568
Claims priority, application Japan, May 2, 1975, 50-53985
Int. Cl.² G03B 9/34
U.S. Cl. 354—244 6 Claims



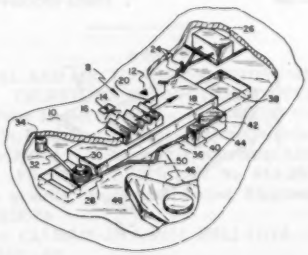
1. In a camera of the type having a focal plane electric shutter comprising a front blind which runs from a blocking to an unblocking position to start exposure, a rear blind which runs from an unblocking position to a blocking position to end the exposure, and an electromagnet for retaining and releasing said rear blind to hold said rear blind in said blocking position and to permit said rear blind to run to its unblocking position, respectively, the improvement comprising mechanical means, responsive to the start of movement of said rear blind from an unblocking to a blocking position simultaneously with the start of movement of said front blind from a blocking to an unblocking position, for stopping the movement of said rear and front blinds before they move to the blocking and unblocking positions respectively.

4,034,391

EXPOSURE CONTROL APPARATUS HAVING TWO EXPOSURE TIME SETTING POSITIONS

Heinz G. Bethmann, Feilbach; Heinz Kilguss, Kornwestheim, and Horst Simon, Feilbach, all of Germany, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1976, Ser. No. 655,926
Claims priority, application Germany, Feb. 21, 1975, 2507432
Int. Cl.² G03B 7/00
U.S. Cl. 354—289 6 Claims



6. In a photographic camera having a camera housing and an adjustable exposure control system, means for adjusting the exposure control system comprising:

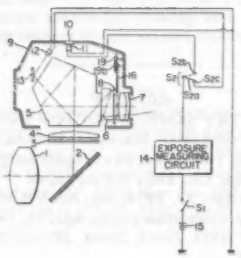
a. a setting member for setting the exposure control system, movable between a first position and a second position;
b. latch means attached to said setting member and engageable with the camera housing for releasably holding said setting member in said second position;
c. spring means for:
   1. urging said latch means into latching engagement with the camera body, and
   2. applying a restoring force to said setting member to urge said setting member towards said first position;
d. release means, effective when actuated, to apply a force to said latch means against the force of said spring means to:
   1. release said latch means from engagement with the camera body, and
   2. increase the tension on said spring means, thereby increasing the restoring force exerted by said spring means on said setting member.

4,034,392

EXPOSURE INDICATOR DEVICE IN A SINGLE LENS REFLEX CAMERA WITH A TTL EXPOSURE METER CONTAINED THEREIN

Sunao Ishizaka, and Yasuhito Kawahara, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed June 22, 1976, Ser. No. 698,682
Claims priority, application Japan, June 27, 1975, 50-89959[U]
Int. Cl.² G03B 17/00
U.S. Cl. 354—289 6 Claims



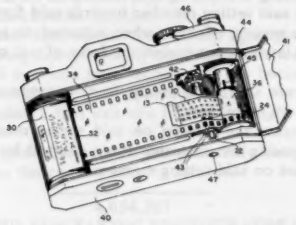
1. An exposure indicator device in a single lens reflex camera with a TTL exposure meter contained therein, comprising:
shutter means extraneously operable for displacement between a position in which it closes a finder optical system at the eyepiece portion thereof to intercept light passed through the finder eyepiece portion into the interior of the finder and a position in which it is retracted from said first-named position;
first indicator means for effecting exposure indication within the view field of the finder; and
second indicator means for effecting exposure indication outside the view field of the finder;
the improvement comprising:
change-over means operatively associated with said shutter means to cause only said first indicator means to effect the exposure indication when said shutter means is in said retracted position and to cause only said second indicator means to effect the exposure indication when said shutter means is in said light-intercepting position.

4,034,393

FILM REGISTRATION DEVICE

Howard K. Goldmacher, 136 Worthen Road, Lexington, Mass. 02173

Filed Feb. 24, 1976, Ser. No. 660,842
Int. Cl.² G03B 19/00
U.S. Cl. 354—354 9 Claims



1. A device to enable a film strip packaged in a cassette to be installed in a camera, less than the total number of frames to be exposed, the film strip to be rewound into the cassette without rewinding the tongue end of the film into the cassette, the cassette to be removed from the camera, the cassette to be subsequently reinstalled into the camera, and the film strip to be advanced to the first remaining unexposed frame with correct registration with respect to the camera exposure counter and the exposed frame, comprising:

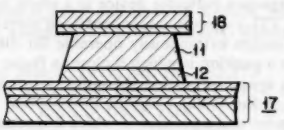
a projection disposed near the tongue end of the film strip forming a mechanical stop and arranged to contact the light trap of the film cassette during a rewind operation, thus alerting the user to cease rewinding thereby preventing rewinding of the film end into the cassette, said projection having associated index means alignable with selected teeth of the camera film drive sprocket.

4,034,394

SCHOTTKY SEMICONDUCTOR DEVICE

Hisao Kamo, Yokohama; Masahiro Kuroda, Tokyo, and Susumu Okano, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Tokyo, Japan

Filed Apr. 13, 1976, Ser. No. 676,493
Claims priority, application Japan, Apr. 16, 1975, 50-45168
Int. Cl.² H01L 29/48, 29/06, 29/161, 23/48
U.S. Cl. 357—15 4 Claims



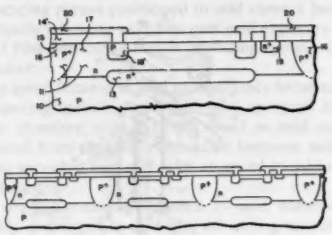
1. A Schottky semiconductor device which comprises a GaAs single crystal body, said GaAs single crystal body being of a mesa shape; a first metal layer formed of at least one selected from the group consisting of niobium, tantalum and vanadium and mounted on one side of the GaAs single crystal body to provide a Schottky junction between said first metal layer and GaAs single crystal body, a second metal layer prepared from at least one selected from the group consisting of platinum and palladium and deposited on said first metal layer; and a third metal layer formed of gold and provided on said second metal layer.

4,034,395

MONOLITHIC INTEGRATED CIRCUIT HAVING A PLURALITY OF RESISTOR REGIONS ELECTRICALLY CONNECTED IN SERIES

Mona M. Abdelrahman, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 29, 1976, Ser. No. 727,743
Int. Cl.² H01L 23/56, 29/66, 27/02, 27/04
U.S. Cl. 357—28 6 Claims



1. A monolithic integrated circuit resistor provided in a semiconductor material having a voltage coefficient of resistance which is less than a selected value, said resistor comprising:

a set of *n* isolated regions in said semiconductor material, each of a first conductivity type;

a set of *n* resistor regions, each of a second conductivity type and each being located in a corresponding one of said isolated regions, there being a semiconductor junction occurring between each said resistor region and its corresponding isolated region, each of said resistor regions having a first end and a second end; and

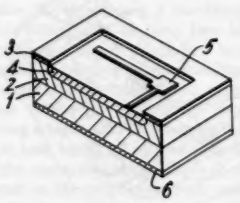
an interconnection network means electrically connecting each of said resistor regions in series with one another at said first and second ends in a resistor string and further adapted to electrically connect said resistor string into a circuit, said interconnection network means directly electrically connecting said first end of each said resistor region to its corresponding isolated region, a value for *n* being selected of two or more to be sufficiently large to reduce said voltage coefficient of resistance to being less than said selected value.

4,034,396

LIGHT SENSOR HAVING GOOD SENSITIVITY TO VISIBLE LIGHT

Tetsuro Nakamura, and Hideaki Suzuki, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Filed May 22, 1975, Ser. No. 579,848
Claims priority, application Japan, May 24, 1974, 49-59178
Int. Cl.³ H01L 27/14
U.S. Cl. 357—30 4 Claims



1. A radiation sensing device for sensing visible light including

a semiconductor substrate of one conductivity type having an energy gap, said energy gap being between 1.80 eV

and 2.0 eV and said semiconductor substrate being formed of Ga As_{1-x} P_x in which x has a value between 0.32 and 0.52;

a region of an opposite conductivity type which is formed in one surface of said substrate and extends to a depth of between 0.1 micron and 1.0 micron beneath said one surface;

a first electrode which is electrically connected to said region; and

a second electrode which is electrically connected to said substrate whereby an electric current flows between said first and second electrodes when said region is exposed to said visible light.

4,034,397

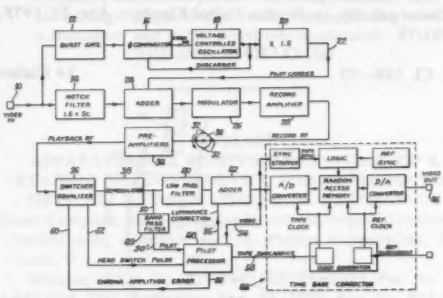
PILOT SIGNAL LUMINANCE CORRECTION MEANS FOR VIDEO RECORDING APPARATUS

Allen J. Trost, Cupertino, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Mar. 19, 1976, Ser. No. 668,660

Int. Cl.² H04N *5/78, 5/795*

U.S. Cl. 358—8 **16 Claims**



16. In video recording and reproducing apparatus of the type which has at least one transducing head which cooperates to record on and reproduce from a recording medium and utilizes frequency modulation of a carrier signal with a video signal, said video signal having a pilot signal of predetermined frequency included therein prior to recording, a system for providing luminance error correcting signals during reproducing for combining with the video signal, comprising:

means for recovering said pilot signal from the video signal following demodulation;

discriminating means associated with said recovering means for generating a voltage output that varies in proportion to the frequency deviation of said pilot frequency caused by velocity errors;

means operatively connected to said discriminating means for adding the output thereof to the demodulated video signal to correct for luminance errors which result from said velocity errors.

4,034,398

OPTICAL AND MECHANICAL IMPROVEMENTS FOR TELEVISION PROJECTION SYSTEM

Charles Peter Hedley Sheldrake, and Timothy Gunton Blake, both of St. Peter Port, Guernsey, Channel Islands, assignors to Electro-Optiek, N.V., Curacao, Netherlands Antilles

Filed Sept. 15, 1975, Ser. No. 613,089

Claims priority, application United Kingdom, Aug. 27, 1975, 35428/75

Int. Cl.² H04N *5/74, 9/31;* **H01J** *29/18, 31/10*

U.S. Cl. 358—60 **16 Claims**

1. A television projector comprising a plurality of color separation assemblages, each including, along an optic axis:

a. forwardly directed electron source means;

b. rearwardly directed phosphor target means;

c. forwardly directed converging mirror means having an aperture;

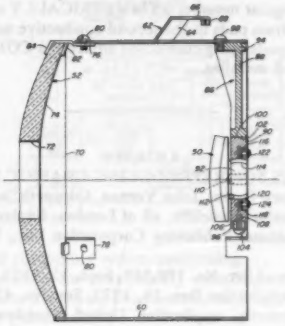
d. forwardly positioned corrector means;

e. evacuated envelope means;

f. said electron source means, said mirror means and said target means being disposed in said envelope means;

g. said electron source means, said mirror means, said target means and said corrector means being disposed along an optic axis;

h. first mounting means including only a single post portion extending radially toward said optic axis and a bearing portion having an inner cylindrical bearing surface with an axis coinciding with the optic axis;



i. second mounting means having an outer cylindrical bearing surface and an inner spherical bearing surface, said outer cylindrical bearing surface being slidable within said inner cylindrical bearing surface;

j. third mounting means having an outer spherical bearing surface being pivotally seated in said inner spherical bearing surface, said third mounting means carrying said target means;

k. first screw means for locking said second mounting means with respect to said first mounting means; and

l. second screw means for locking said third mounting means with respect to said second mounting means.

4,034,399

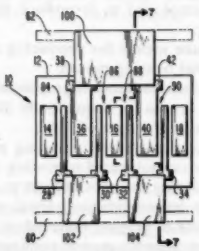
INTERCONNECTION MEANS FOR AN ARRAY OF MAJORITY CARRIER MICROWAVE DEVICES

Ira Drukier, New York, N.Y., and Edward Mykietyn, Trenton, N.J., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 27, 1976, Ser. No. 662,001

Int. Cl.² H01L *23/48, 23/02, 39/02, 27/02*

U.S. Cl. 357—68 **10 Claims**



1. In a majority carrier transistor array comprising a plurality of integrated field effect transistors situated on a substrate wherein each transistor comprises a source and a drain separated by a channel, a source contact connected to the source, a drain pad connected to the drain, and a gate pad connected

to the channel, and wherein each of the gate pads is situated adjacent a common edge of the substrate and each of the drain pads is situated adjacent another common edge, the array further comprising means for connecting each of the gate pads to a first conductive member and means for connecting each of the drain pads to a second conductive member, the improvement wherein the means for connecting each of the gate pads comprises at least ONE bilaterally symmetric first quadrangular conductive member SYMMETRICALLY interconnecting a PLURALITY of gate pads to the first conductive member, each of the gate pads being connected adjacent a COMMON EDGE of the first member, and the improvement wherein the means for connecting each of the drain pads comprises at least ONE second bilaterally symmetric conductive quadrangular member SYMMETRICALLY connecting a plurality of drain pads to the second conductive member, each of the drain pads being connected adjacent a COMMON edge of the second member.

4,034,400

APPARATUS FOR REPRODUCING GRAPHIC MATERIAL

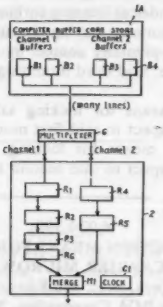
David Gregory Owen; John Vernon Ashworth, and Paul Anthony Beaufort Radcliffe, all of London, England, assignors to International Publishing Corporation Ltd., London, England

Continuation of Ser. No. 179,959, Sept. 13, 1971, abandoned. This application Dec. 26, 1973, Ser. No. 428,047

Claims priority, application United Kingdom, Sept. 23, 1970, 45398/70

Int. Cl.² H04N *1/04*

U.S. Cl. 358—75 **18 Claims**



1. A photo composing scanning system having an apparatus for scanning graphic material to produce an electrical output signal which is employed to reproduce the graphic information, comprising:

cathode ray tube means for producing a spot of light,

graphic-material bearing means,

a plurality of discrete items of graphic material mounted on the bearing means for sequentially illuminating elements of the items by the spot of light,

random access step-by-step scanning means connected to the cathode ray tube and operating in a random access mode for causing the spot of light to scan sequentially in step-by-step increments individual selected portions of selected items of graphic material on the bearing means,

random access starting means connected to the scanning means for beginning scanning of the spot at precisely selected predetermined orthogonal coordinates of a starting point for each selected portion,

scan length control means connected to the first means and operating in a random access mode for controlling lengths of scan lines on which the spot of light is caused to scan the selected items whereby amount of the graphic-material bearing means covered by any scan line is controlled,

step size control means connected to the scanning means and operating in a random access mode for controlling size of step-by-step increments in which the spot is advanced along the scan line, thereby controlling time intervals covered by one scan in the electrical output signal and controlling resulting magnification scale between scanned items and reproductions of said items,

spot size control means connected to the cathode ray tube means for controlling spot size, and

photosensitive detector means connected to the cathode ray tube means responsive to light which has scanned the graphic material for producing said electrical output signal modulated according to the graphic material.

4,034,401

OBSERVER-IDENTIFICATION OF A TARGET OR OTHER POINT OF INTEREST IN A VIEWING FIELD

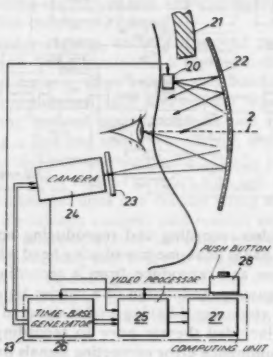
George Mann, Winchcombe, England, assignor to Smiths Industries Limited, London, England

Filed Apr. 21, 1976, Ser. No. 678,795

Claims priority, application United Kingdom, Apr. 22, 1975, 16701/75

Int. Cl.² H04N *3/00, 7/18*

U.S. Cl. 358—93 **14 Claims**



1. A system for providing identification of a point of interest in a field of view of an observer comprising means operable to provide a measure of eye position of the observer when the observer is looking at said point, means to define a reference point relative to said field of view, means operable to provide a measure of eye position of the observer when the observer is looking at said reference point, and means responsive to the two said measures of eye position to provide a representation identifying said point of interest relative to said reference point.

4,034,402

VIDEO SCRAMBLING SYSTEM

Jack Brian, Torrance, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed July 1, 1974, Ser. No. 484,536

Int. Cl.² H04N *1/44*

U.S. Cl. 358—114 **6 Claims**

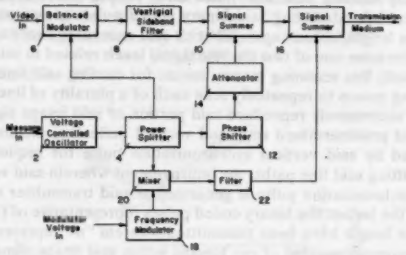
1. A system for producing a scrambled television signal, comprising:

a variable frequency source of radio frequency carrier wave energy for receiving a time varying signal and producing a frequency-modulated radio frequency carrier;

balanced modulator means for amplitude modulating video information upon said frequency-modulated radio fre-

quency carrier to produce a frequency and video amplitude modulated, suppressed carrier television signal;

phase shift means responsive to said frequency-modulated radio frequency carrier for producing a phase-shifted, frequency-modulated, radio frequency carrier; and



means for combining said suppressed carrier television signal with said phase-shifted, frequency-modulated radio frequency carrier to produce a scrambled television signal having a phase-shifted radio frequency carrier which is frequency and video amplitude modulated.

4,034,403

APPARATUS FOR POSITIONAL CONTROL OF A READING HEAD IN A DEVICE FOR REPRODUCING OPTICALLY CODED VIDEO DISK RECORDINGS

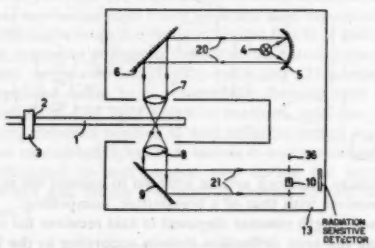
Klaas Compaan, and Gijsbertus Bouwhuis, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 229,291, Feb. 25, 1972, Pat. No. 3,833,769. This application Aug. 29, 1974, Ser. No. 501,676

Claims priority, application Netherlands, Mar. 11, 1971, 7103234

Int. Cl.² G11B 7/12, 7/16, 7/24

U.S. Cl. 358—128 **10 Claims**



1. Apparatus for reading, by means of a beam of radiation, a disk-shaped information carrier which contains spirally arranged information signals coded in optical form, which apparatus comprises a source of radiation, a radiation-sensitive signal detector cell, the information carrier being disposed in the radiation path between this source and this radiation-sensitive signal detector cell, a periodic grating which consists of radiation-transmitting and radiation-absorbing stripes, optical means in the path of the radiation emanating from the carrier for imaging on the grating part of the grating-shaped structure of the carrier information track in the vicinity of the portion of this track to be read as a plurality of stripes substantially parallel to the grating stripes, and a further radiation-sensitive detection system in the path of the radiation emanating from the grating, wherein the detection system produces a focus control signal for said optical means.

4,034,404

SIGNAL COMBINING SYSTEM FOR BINARY PULSE SIGNALS

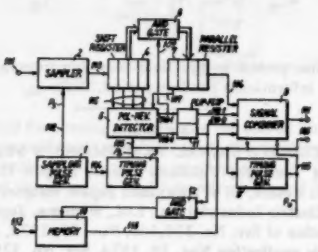
Yukio Nakagome, Yokohama, and Yasuo Fukata, Mitaka, both of Japan, assignors to Kokusai Denshin Denwa Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 459,719, April 10, 1974, abandoned. This application June 13, 1975, Ser. No. 586,722

Claims priority, application Japan, Apr. 12, 1973, 48-40832

Int. Cl.² H04J 3/16

U.S. Cl. 358—142 **3 Claims**



1. A signal combining system comprising:

sampling means for successively sampling a main input signal from a main input communication circuit to obtain a binary pulse train;

first temporary storage means connected to said sampling means for temporarily and successively storing therein pulses of the binary pulse train in the form of blocks each corresponding to a certain number of bits;

polarity reversal detecting means connected to said first temporary storage means for deriving therefrom a first output and a second output depending on whether or not polarity reversal is present in the bit block stored in the first temporary storage means in comparison with the last bit in a bit block immediately preceding the same;

at least one second temporary storage means for temporarily storing therein secondary input information from at least one secondary input communication circuit; and

signal combining means connected to said first temporary storage means, and secondary temporary storage means and said polarity reversal detecting means for combining, as a converted output, the contents of said first temporary storage means in response to the first output of said polarity reversal detecting means and the contents of said second temporary storage means in response to the second output of said polarity reversal detecting means, respectively, together with a sign bit appended to each of the combined blocks of bits for indicating in which of said first and second temporary storage means the respective combined blocks of bits were stored.

4,034,405

TELEVISION FACSIMILE TRANSMISSION SYSTEM

Peter Johannes Hubertus Janssen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,098

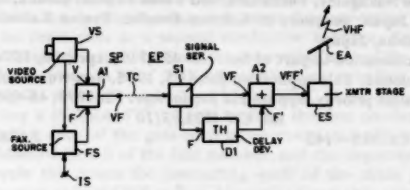
Claims priority, application Netherlands, Nov. 20, 1974, 7415098

Int. Cl.² H04N 7/08

U.S. Cl. 358—147 **5 Claims**

3. Television facsimile transmitter comprising, first means for transmitting facsimile information in the form of code words which occur in at least one line period in a television

field blanking interval, and second means coupled to said first transmitting means for transmitting in at least one more successive line period in the field blanking interval the same facsimile information per line period.

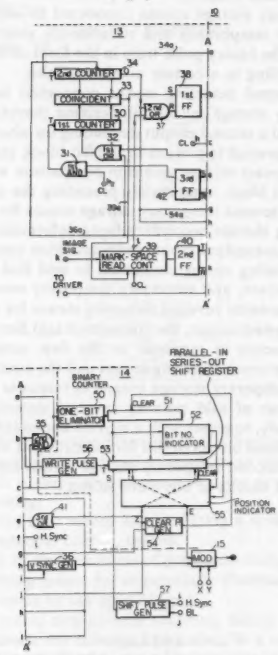


4,034,406

FACSIMILE SIGNAL TRANSMISSION SYSTEM

Hiroyoshi Tsuchiya; Yukifumi Tsuda; Heijiro Hayami, and Hiroaki Kotera, all of Kawasaki, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Continuation of Ser. No. 310,540, Nov. 29, 1972, abandoned.
This application Nov. 20, 1974, Ser. No. 525,659
Claims priority, application Japan, Nov. 29, 1971, 46-96488
Int. Cl.² H04N *1/04, 1/32, 1/38*
U.S. Cl. 358—260 8 Claims



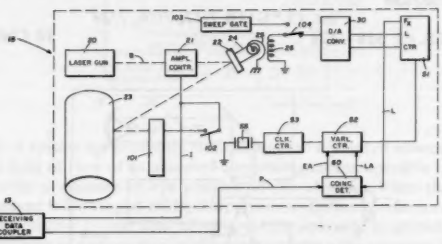
1. In a facsimile communication system for transmitting signals representative of the light levels of a two-valued object, comprising, at a transmitter station, line scanning means, means for causing said scanning means to repeatedly scan each of a plurality of line paths in said object at a predetermined rate, means for developing an image signal related to the light levels of each of said line paths, means for generating, during a portion of an individual scan of a single line path, a run length representative of a portion of said image signal, means for generating a vertical synchronization pulse, means for encoding said run length into a series of binary coded pulses, means for transmitting each said coded pulses at said predetermined rate and said vertical synchronization pulse to a receiver station, and vertical deflecting means for sequentially shifting said line paths and, at said receiver station, means for decoding said binary coded pulses to recover said run length, means operable with said recovered run length to determine one of two discrete signal levels related to said light levels, line scanning means, means for causing said line scanning means to repeatedly scan each of a plurality of line paths to successively reproduce said portion of said image signal at said predetermined rate, and vertical deflecting means actuated by said vertical synchronization pulse for sequentially shifting said line paths, the improvement wherein said vertical synchronization pulse is generated at said transmitter station at the instant the binary coded pulses representative of (n-1)th run length have been transmitted wherein "*n*" represents the maximum number of run lengths within said image signal, and means is provided at said receiver station to delay the actuation of said vertical deflecting means for a period sufficient to reconstruct *n*th run length.

4,034,407

SCAN INTERLOCK SYSTEM

Roy W. Rivers, Farmington, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 17, 1976, Ser. No. 658,442
Int. Cl.² H04N *1/36*
U.S. Cl. 358—267 9 Claims



1. A scan interlock system adapted to control the scan rate of a receiver with that of a transmitter, comprising:

a fixed length counter disposed in said receiver for controlling the scan deflection therein according to the bit output thereof;

timing signal generating means disposed in said transmitter for providing a timing pulse concurrent with each scan;

coincidence detecting means disposed in said receiver connected to receive a selected one of said bit outputs in said fixed length counter and said timing pulse for alternatively producing a first and second control signal corresponding to the lead or lag relationship between said selected one bit and said timing pulse;

a clock disposed in said receiver for generating a clock signal; and

a variable length counter disposed in said receiver and connected to receive said first and second control signals and said clock signal for producing a count signal to said fixed length counter at a first or second factor of said clock signal corresponding to the presence of said first or second control signals.

4,034,408

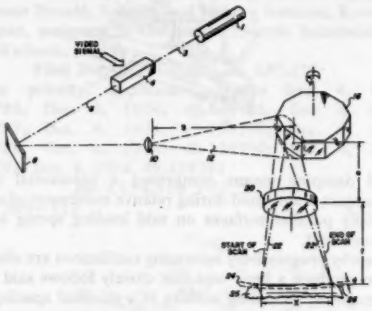
FLYING SPOT SCANNER

Gary K. Starkweather, Saratoga, Calif., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 488,332, July 15, 1974, abandoned, and Ser. No. 519,378, Oct. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 488,332, , which is a continuation of Ser. No. 309,859, Nov. 27, 1972, abandoned. This application July 7, 1975, Ser. No. 593,891

Int. Cl.² H04N 1/10

U.S. Cl. 358—293 6 Claims



1. An apparatus for recording the information content of an electrical signal on the surface of a light sensitive medium by means of a plurality of scan traces across said medium comprising:

means for providing a light beam of high intensity,

means for modulating said light beam of high intensity to provide a light beam modulated in accordance with the information content of an electrical signal supplied to said modulator means,

reflector means having a plurality of contiguous reflective facets rotatable about a central axis,

means for rotating said reflector means about said central axis, and

lens means disposed in the path of said modulated light beam for both (1) expanding the cross-sectional area of said modulated light beam such that said expanded beam illuminates more tha two contiguous facets of said reflector means at any given instant of time during each scan trace to provide a high duty cycle and (2) imaging said expanded beam to a substantially focused spot at the surface of said light sensitive medium, said lens means being disposed relative to said reflector means such that said modulated light beam travels in a plane substantially orthogonal to said central axis during the expansion thereof and during the imaging thereof to said focused spot.

4,034,409

METHOD AND APPARATUS FOR MAGNETICALLY RECORDING GRAPHIC INFORMATION

Sidney Levy, 145 W. Cuthbert Blvd., Oaklyn, N.J. 08107

Filed Apr. 16, 1975, Ser. No. 568,705

Int. Cl.² H04N 1/22

U.S. Cl. 358—301 27 Claims

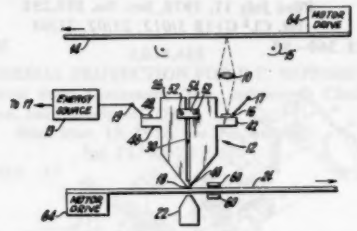
1. An imaging apparatus for line by line recording of graphic information from an original onto a receiving surface, comprising:

a. means for providing a magnetic field;

b. means for shaping the magnetic field to a substantially linear configuration;

c. electrical means for simultaneously varying the intensity of the linear magnetic field along the length of said line in accordance with the variations of light and shade information contained in the full width of a corresponding line of the original graphic information, and

d. toner supply means positioned in juxtaposition to said shaping means and in magnetically attractable relation to



said field for causing transfer of a full line of toner material from said toner supply means to the receiving surface in quantities along said line corresponding to the variations of the magnetic filed intensity along said line.

4,034,410

MAGNETIC RECORDING MEDIUM

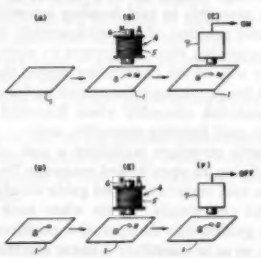
Kazuo Suzuki, and Shinichiro Akuta, both of Ohtsu, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 10, 1975, Ser. No. 566,720

Claims priority, application Japan, Apr. 10, 1974, 49-41303

Int. Cl.² G11B 5/62, 5/00

U.S. Cl. 360—55 2 Claims

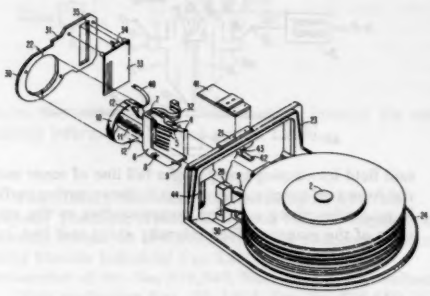


1. A magnetic recording system comprising a magnetic sheet of domain sized particles of at least one member selected from the group consisting of barium ferrite, strontium ferrite and lead ferrite, uniformly dispersed in an organic binder, and a ferromagnetic plate bonded to one surface of said sheet, the other surface of said sheet being magnetizable at selected locations, means comprising an electromagnet having a substantially rod shaped core for magnetizing said particles at said selected locations in said other surface in a direction substantially perpendicular to said other surface, thereby to store information in the orientation of magnetic flux in perpendicular magnetic particles, means for detecting only one type of magnetic pole at said selected locations, and means comprising an electromagnet having a substantially rod shaped core for erasing the information stored in said perpendicularly oriented magnetic particles at all locations by changing the type of magnetic pole to be non-detectable by said means for detecting.

4,034,411
MAGNETIC DISK INFORMATION STORAGE APPARATUS

Edward Joseph Kraemer, and Tulsidas Ramlal Patel, both of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 11, 1975, Ser. No. 595,251
Int. Cl.² G11B 5/012, 23/02, 21/08
U.S. Cl. 360—98 **35 Claims**



1. A housing assembly comprising part of a magnetic disk information storage apparatus and adapted to receive therein a removable head/disk subassembly comprising a rigid support structure, spindle means rotatably mounted in said support structure, magnetic disk means mounted on said spindle means for concentric rotation therewith, magnetic head means in transducing relation with said disk means, carriage means supporting said head means and being mounted on said support structure for movement alone a linear path whereby to carry said head means to different positions relative to said means, hollow rigid electrically conductive coil means supported on said carriage means, and means for electrically connecting said coil means to said housing assembly;

said housing assembly comprising registration and guide means adapted to guide such a head/disk assembly parallel to the carriage means linear path during mounting of the head/disk assembly in said housing assembly and to define an operative position of the subassembly therein,

means for supplying electric current to such a head/disk assembly by way of the connecting means thereof,

drive means for providing rotary drive to the spindle means of such a head/disk assembly when mounted in its operative position in said housing assembly, and

a magnetizable structure including a pair of magnetic pole means defining an open ended magnetic flux gap, extending parallel to said registration and guide means and adapted to receive the coil means therein when such a head/disk assembly is guided into its operative position in said housing assembly, so as to constitute a linear electromagnetic actuator for moving said carriage along its linear path in response to current from said supply means.

4,034,412
MAGNETIC TRANSDUCER APPARATUS WITH DAMPED SPRING ACTION

Curtiss A. Smith, El Cajon, Calif., assignor to Davis-Smith Corporation, San Diego, Calif.

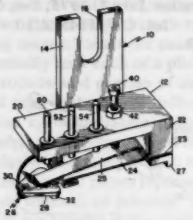
Filed Jan. 19, 1971, Ser. No. 107,797
Int. Cl.² G11B 5/60, 17/34
U.S. Cl. 360—103 **13 Claims**

1. In a magnetic transducer unit having a frame, and a magnetic recording head unit mounted for limited movement relative to said frame, wherein said head unit is to be supported a minimal distance away from a moving magnetic recording surface by the air carried along with said surface, said spacing to be substantially maintained despite irregularities in the movement of said surface that would otherwise tend to induce oscillation in said head unit, wherein the improvement comprises:

bias means including a loading spring,

a supporting spring which cooperates with said bias means for supporting said head unit at said minimal distance,

damping means for damping said oscillations of said head induced by said moving magnetic recording surface,



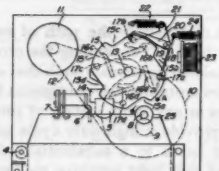
said damping means comprising a substantial area of contact maintained during relative movement of substantially parallel surfaces on said loading spring and said head unit,

whereby progressively increasing oscillations are eliminated to produce a head unit that closely follows said moving magnetic recording surface at a minimal spacing therefrom.

4,034,413
MAGNETIC HEAD LIFTING DEVICE

Kumeo Tahara, Iwaki, Japan, assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 29, 1975, Ser. No. 608,854
Claims priority, application Japan, Sept. 5, 1974, 49-106992[U]
Int. Cl.² G11B 21/08, 5/55
U.S. Cl. 360—106 **10 Claims**



1. A magnetic head lifting device adaptable for use in a multi-track tape player, comprising:

a rotary body having a peripheral edge with indented portions therein;

ring means rotatable in association with a capstan shaft and positioned for rotating said rotary body by engaging the peripheral edge of said rotary body and disengaging said edge at said indented portions thereof,

urge member means for selectively urging said rotary body in a predetermined direction of rotation;

stopper means for selectively engaging said rotary body and preventing the rotation of said rotary body by said urge member means;

actuation means for disengaging said stopper means from said rotary body and permitting the rotation of said rotary body by said urge means, the rotation of said rotary body thereby causing said ring means to engage the peripheral edge of said rotary body;

anti-excessive rotation means including a member having its position controlled by said actuation means for selectively engaging said rotary body and positively preventing an excessive rotation of said rotary body by said ring means, and

stepped surface cam means integrally associated with the rotation of said rotary body for moving the position of the magnetic head.

4,034,414
MAGNETIC HEAD

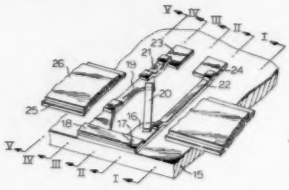
Nobuyuki Kaminaka, Moriguchi; Kenji Kanai, Neyagawa; Norimoto Nouchi, Katano, and Noboru Nomura, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 3, 1975, Ser. No. 637,478

Claims priority, application Japan, Dec. 4, 1974, 49-139785; Dec. 4, 1974, 49-139786; Dec. 4, 1974, 49-139787; Dec. 4, 1974, 49-139788; Dec. 4, 1974, 49-139789; Dec. 4, 1974, 49-139790; Dec. 4, 1974, 49-139793; Dec. 4, 1974, 49-139791

Int. Cl.² G11B *5/12, 5/30*

U.S. Cl. 360—113 **8 Claims**



1. A magnetic head which comprises: a non-magnetic substrate, a first thin ferromagnetic plate member on said non-magnetic substrate; a non-magnetic layer on said first thin ferromagnetic plate member; a second thin ferromagnetic plate member on said non-magnetic layer, the plate members, the non-magnetic layer and the substrate having edges aligned and the non-magnetic layer separating the plate members in a direction perpendicular to said substrate for defining a gap between said plate members for facing a recording medium; the ferromagnetic plate members having end portions extending away from said aligned edges on said substrate and having signal output means coupled to said end portions, the end portion of one of said plate members being spaced along said substrate from the end portion of said other plate member; a magnetoresistance effect element connected between the end portions of said plate members remote from said aligned edges for magnetically linking the ferromagnetic plate members; and bias plate means overlying said plate members and said magnetoresistance effect element and parallel to the surface of the non-magnetic substrate.

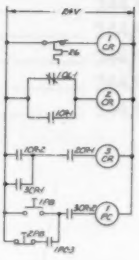
4,034,415
THERMAL PROTECTION FOR D.C. MOTORS

James David Suer, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed Mar. 15, 1976, Ser. No. 666,923

Int. Cl.² H02H *7/085*

U.S. Cl. 361—24 **1 Claim**



1. A control apparatus for a direct current motor including a casing and an armature, the casing being susceptible to heating from the armature, the motor having a substantial thermal inertia and adapted for use alternatively in intermittent and continuous duty cycles, the control apparatus comprising in combination:

a. an overload heater operable in response to motor current and having a thermal inertia less than that of the motor;

b. a temperature sensor mounted on and sensitive to the temperature of the casing for operation;

c. a power relay operable one way and the other for connecting electrical energy to the motor;

d. a control relay having contacts in circuit to control the condition of operation of the power relay;

e. a circuit having a pair of parallel paths to the control relay for energization thereof;

f. means in one of the parallel paths operated by the heater, and

g. means in the other of the parallel paths operated by the sensor whereby electrical energy is disconnected from the motor in response to both said heater and said sensor at the same time.

DESIGN PATENTS

GRANTED JULY 5, 1977

ERRATA

For CLASS	See PATENT NO.
015–112	244,929
014–010	244,943
013–024	244,944
024–021	244,945
014–005	244,961
014–075	244,962
014–070	244,963

DESIGN PATENTS

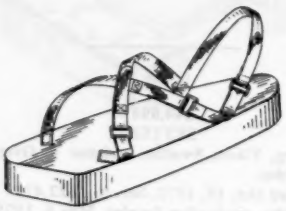
GRANTED JULY 5, 1977

ERRATA

DESIGNS

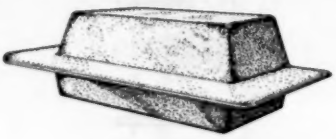
JULY 5, 1977

244,886
SHOE SUPPORT
Donald A. Perser, Northbrook, and Michael Franz Helmut Cook, Chicago, both of Ill., assignors to Ballert Orthopedic Corporation, Chicago, Ill.
Filed Sept. 15, 1975, Ser. No. 613,277
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—264

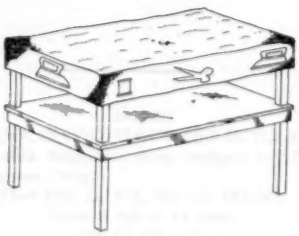


244,887
NECKWEAR
Walter W. Haines, Sr., 1511 Oakdale St., Philadelphia, Pa. 19132
Filed Jan. 20, 1975, Ser. No. 542,569
Term of patent 14 years
Int. Cl. D2—*05*
U.S. Cl. D2—351

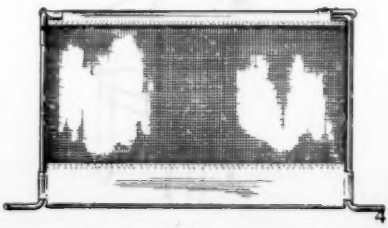
244,888
COMBINED TRAFFIC CONTROL CABINET AND PUBLIC TRANSPORTATION BENCH
Gregory Shafer, 9847 W. 75th Way, Arvada, Colo. 80005, and Joseph P. Serafini, 737 Zinnia, Golden, Colo. 80401
Filed Sept. 10, 1975, Ser. No. 611,899
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—4



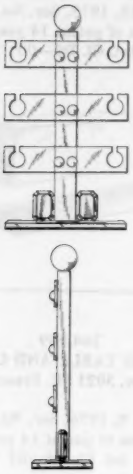
244,889
COMBINED SEWING TABLE AND COVER THEREFOR
Louise I. Neuschwander, 3021 SE. Francis St., Portland, Oreg. 97221
Filed Jan. 9, 1976, Ser. No. 647,742
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—4



244,890
PLAYPEN
Ruey C. Adams, Columbus, Ind., assignor to Cosco, Inc., Columbus, Ind.
Filed Feb. 5, 1976, Ser. No. 655,470
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—13

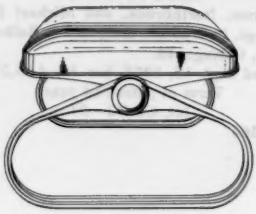


244,891
DISPLAY RECEPTACLE FOR EYEGLASSES OR THE LIKE
Stefan Engelmann, 61-38 164 St., Flushing, N.Y. 11365
Filed Aug. 14, 1975, Ser. No. 604,706
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—24

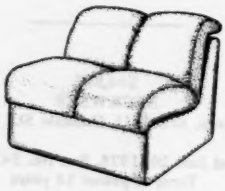


244,892
SWIVEL CHAIR
Earl H. Koepke, Sturgis, Mich., assignor to Harter Corporation, Sturgis, Mich.
Filed Feb. 26, 1976, Ser. No. 661,704
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31

244,893
OTTOMAN
Hans Diehl, Haus Haufroos 6, 5452 Oberrohrdorf, Switzerland
Filed Feb. 5, 1976, Ser. No. 655,543
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—36

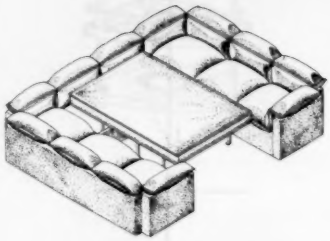


244,894
SETTEE
Robert Tillberg, Viken, Sweden, assignor to Overman AB, Tranas, Sweden
Filed Oct. 15, 1975, Ser. No. 622,470
Claims priority, application Sweden, May 6, 1975, 75973
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—47



244,895
CHAIR
Hans Diehl, Haus Haufroos 6, 5452 Oberrohrdorf, Switzerland
Filed Feb. 5, 1976, Ser. No. 655,544
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—56

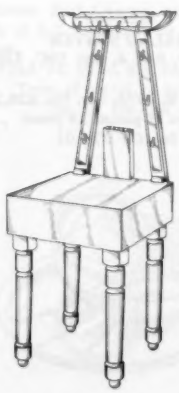
244,896
SOFA BED
Erich Grachten, Detmold, Germany, assignor to Burris Industries, Incorporated, Lincolnton, N.C.
Filed Oct. 22, 1975, Ser. No. 624,528
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



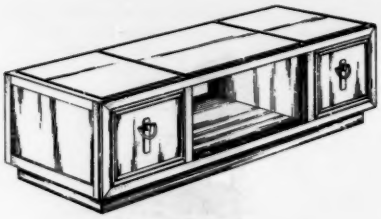
244,897
CHAIR
Peter A. Rocchia, San Francisco, Calif., assignor to The Wicker Works
Filed Mar. 3, 1976, Ser. No. 663,284
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—67

244,898
CHAIR
Peter A. Rocchia, San Francisco, Calif., assignor to The Wicker Works
Filed Mar. 30, 1976, Ser. No. 671,848
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—74

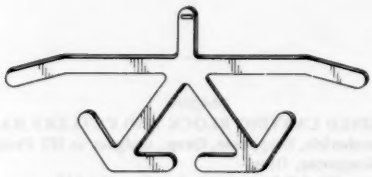
244,899
COMBINED CARVING BLOCK AND CUTLERY RACK
Carl Brandenfels, Scappoose, Oreg., assignor to HT Products, Inc., Scappoose, Oreg.
Filed Feb. 2, 1976, Ser. No. 654,362
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—157



244,900
TABLE
Leon E. Waxman, 11489 Laurelcrest Drive, Studio City, Calif. 91604
Filed Oct. 20, 1975, Ser. No. 623,824
Term of patent 3½ years
Int. Cl. D6—*03*
U.S. Cl. D6—179



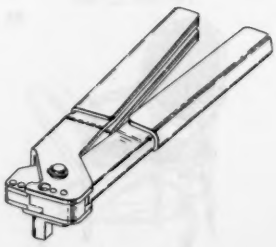
244,901
HANGER BODY
Yutaka Matsumoto, No. 21-1, 1-chome, Higashisugano, Ichikawa, Chiba, Japan
Filed Sept. 10, 1975, Ser. No. 611,990
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—257



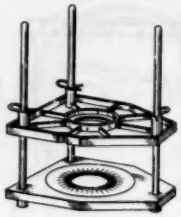
244,902
SALAD SERVER
Gary C. Vonder Haar, Rte. 4, Box 50C, Little Falls, Minn. 56345
Filed Oct. 6, 1975, Ser. No. 620,214
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—3

244,903
FRANKFURTER ROASTING STICK
Oliver W. Hildebrand, Florissant, Mo., assignor to Wirecraft Manufacturing Company, St. Louis, Mo.
Filed Nov. 20, 1975, Ser. No. 633,941
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—106

244,904
DEVICE FOR SEVERING HYPODERMIC NEEDLES AND THE LIKE
Richard Roy Brunner, Hershey, and Gabriel Boenzli, Newport, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.
Filed June 10, 1976, Ser. No. 694,518
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—58

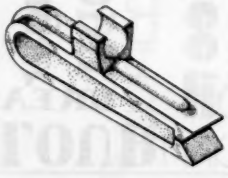


244,905
SUPPORT FOR AN EGG OR THE LIKE
Karl Wach, 4271 Dewey Ave., Rochester, N.Y. 14616
Filed Mar. 28, 1975, Ser. No. 563,074
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—72

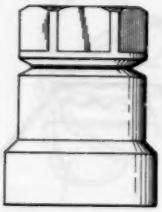


244,906
CONSOLE DESIGN
Antony Richard Gibbs, 27 Lyme Farm Road, Lee Green, London SE. 12, England
Filed Apr. 3, 1975, Ser. No. 564,862
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—181

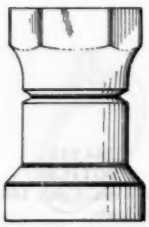
244,907
SKI CLAMP
Reinhold G. Link, 8510 Dog Leg Road, Dayton, Ohio 45414
Filed June 11, 1975, Ser. No. 585,977
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—395



244,908
NUT
Edwin E. Hatter, Torrance, and Bartrom W. Pierce, San Pedro, both of Calif., assignors to Hi-Shear Corporation, Torrance, Calif.
Filed Sept. 8, 1975, Ser. No. 611,074
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—397

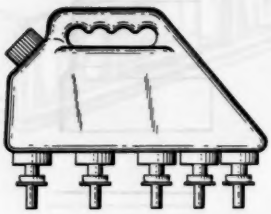


244,909
NUT
Frank L. Gill, Palos Verdes Peninsula, Calif., assignor to Hi-Shear Corporation, Torrance, Calif.
Filed Sept. 8, 1975, Ser. No. 611,075
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—397

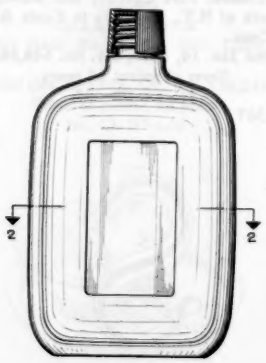


244,910
HOOK
Lee Richard Chasen, Port Chester, and Ruediger Einhorn, Katonah, both of N.Y., assignors to Coats & Clark, Inc., Stamford, Conn.
Filed Jan. 14, 1976, Ser. No. 648,963
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—367

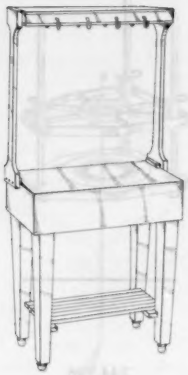
244,911
BATTERY WATER DISPENSER
Clarence A. Herbst, Sr., Park Ridge, and Harvey I. Kling, Clarendon Hills, both of Ill., assignors to Efficiency Dispensers Corporation, Skokie, Ill.
Filed Mar. 5, 1976, Ser. No. 664,351
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—53



244,912
BOTTLE
Diego Zamora Conesa, Avda. Colon 146, San Antonio Abad (Cartagena-Murcia), Spain
Filed Oct. 15, 1971, Ser. No. 189,807
The portion of the term of this patent subsequent to Jan. 30, 1980, has been disclaimed.
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—167

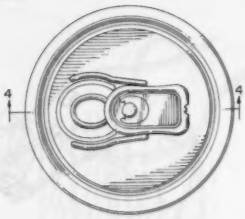


244,913
MOBILE KITCHEN TABLE
Carl Brandenfels, Scappoose, Oreg., assignor to H. T. Products, Inc., Scappoose, Oreg.
Filed Feb. 4, 1976, Ser. No. 655,112
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179

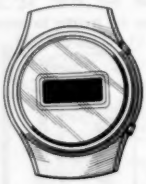


244,914
BAG
Douglas John Nicol, 175 Kirkdale, Sydenham, London SE26 4AH, England
Filed Mar. 31, 1975, Ser. No. 563,355
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—249

244,915
END CLOSURE FOR A CONTAINER
Daniel F. Cudzik, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.
Filed Aug. 20, 1975, Ser. No. 606,310
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—255

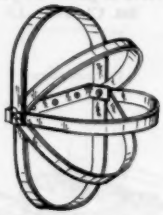


244,916
DIGITAL WRISTWATCH
Naohiro Ueno, Tokyo, Japan, assignor to Bear Co., Ltd., Tokyo, Japan
Filed Sept. 3, 1975, Ser. No. 610,507
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—38



244,917
AUTOMOBILE ACTUATED WALL PROXIMITY INDICATOR
David E. Lewis, 509 Olympia Way, Orange, Calif. 92669
Filed Jan. 28, 1976, Ser. No. 653,273
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—109

244,918
SAFETY REFLECTOR FOR BICYCLES OR THE LIKE
John V. Kitrell, 1830 N. 49th, Lincoln, Nebr. 68504
Filed Oct. 7, 1976, Ser. No. 730,694
Term of patent 14 years
Int. Cl. D10—*11*
U.S. Cl. D10—111



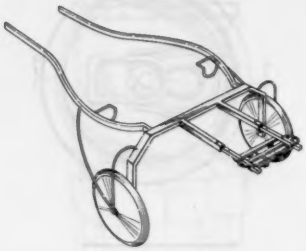
244,919
DIAMOND RING
Erwin Kaluschny, Wayne, N.J., assignor to Jabel Incorporated, Irvington, N.J.
Filed Apr. 16, 1976, Ser. No. 677,659
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—36

244,920
EARRING
Pepi G. Kelman, 19264 Pacific Coast Highway, Malibu, Calif. 90265
Division of Ser. No. 637,852, Dec. 5, 1975, Pat. No. D242,573.
This application Aug. 16, 1976, Ser. No. 714,376
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—75

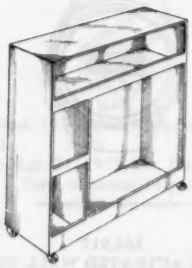
244,921
COMBINED ARMORED VEHICLE BODY AND GUN-TURRET
Jacques Longeau, Suresnes, France, assignor to Societe Anonyme de Vehicules Industriels et d'Equipements Mecaniques Saviem, Suresnes, France
Filed Oct. 8, 1975, Ser. No. 620,780
Claims priority, application France, Apr. 10, 1975, 75.73782
Term of patent 14 years
Int. Cl. D12—*13*
U.S. Cl. D12—12

244,922
COMBINED ARMOURED VEHICLE BODY AND GUN-TURRET
Jacques Longeau, Suresnes, France, assignor to Societe Anonyme de Vehicules Industries et d'Equipements Mecaniques Saviem, Suresnes, France
Filed Oct. 8, 1975, Ser. No. 620,781
Claims priority, application France, Apr. 10, 1975, 75.73783
Term of patent 14 years
Int. Cl. D12—*13*
U.S. Cl. D12—12

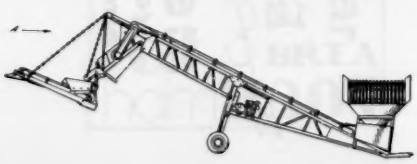
244,923
SULKY
George Ernest Jones, Toronto; Antonio Tangreda, Weston, and Gerardino Tangreda, Etobicoke, all of Canada, assignors to Olympic Metal Products Limited, Toronto, Canada
Filed Apr. 20, 1976, Ser. No. 678,639
Term of patent 14 years
Int. Cl. D12—*01*
U.S. Cl. D12—19



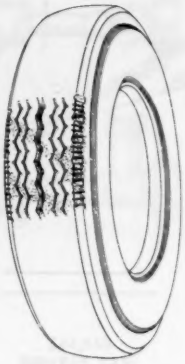
244,924
STORAGE CART FOR ATHLETIC EQUIPMENT
Helen E. Scheibner, 5401 NE. 46th St., Vancouver, Wash. 98661
Filed Aug. 13, 1975, Ser. No. 604,179
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—29



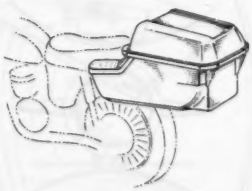
244,925
SCREENING APPARATUS FOR QUARRYING
Patrick O'Neill; Patrick Joseph Douglas, and Michael Lee Mallaghan, all of Dungannon, Ireland, assignors to Powerscreen International Limited
Filed Nov. 11, 1975, Ser. No. 630,774
Term of patent 14 years
Int. Cl. D12—*05*
U.S. Cl. D12—58



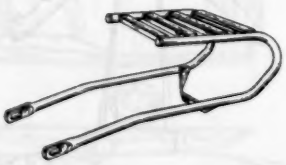
244,926
TIRE FOR A VEHICLE WHEEL
George McIntyre Robertson, Sutton Coldfield, England, assignor to Dunlop Limited, London, England
Filed May 4, 1976, Ser. No. 683,051
Claims priority, application United Kingdom, Dec. 12, 1975, 973626/75
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—143



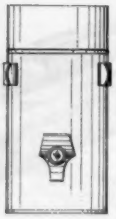
244,927
MOTORCYCLE UTILITY BOX
Edmund H. Anthon, III, 1385 Greenwich, San Francisco, Calif. 94109
Filed Dec. 24, 1975, Ser. No. 644,107
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158



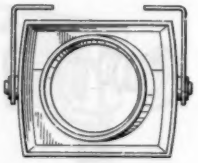
244,928
MOTORCYCLE LUGGAGE RACK
James P. Oakes, Los Angeles, Calif., assignor to Circle Industries, Inc., City of Industry, Calif.
Filed Feb. 19, 1976, Ser. No. 659,347
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—158



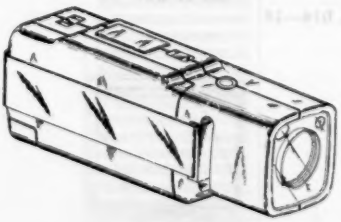
244,929
COMBINED LIQUID DISPENSER AND MOUNTING BRACKET
Robert H. Armstrong, 1507 Coburg Road, Eugene, Oreg. 97401
Filed Feb. 9, 1976, Ser. No. 656,139
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112



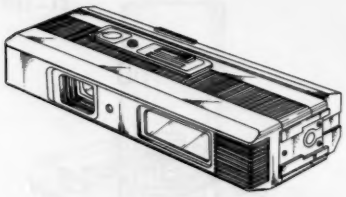
244,930
INSTRUMENT DISPLAY HOUSING OR SIMILAR ARTICLE
John R. Patterson, 4915 Glenwood Drive, Williamsville, N.Y. 14221
Filed Sept. 22, 1975, Ser. No. 615,673
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—192



244,931
MOTION PICTURE CAMERA
Paul D. Miller, New York, N.Y., and Dale Caldwell, Evanston, Ill., assignors to GAF Corporation, New York, N.Y.
Filed Dec. 18, 1975, Ser. No. 642,156
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—3



244,932
CAMERA
Hiroshi Fukuda, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan
Filed May 3, 1976, Ser. No. 682,535
Claims priority, application Japan, Feb. 4, 1976, 51-3294
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—06

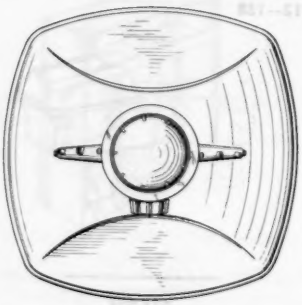


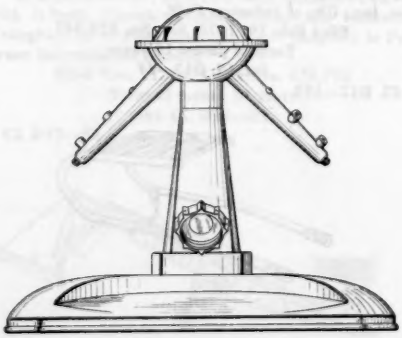
244,933
MOTION PICTURE CAMERA
Toru Yatabe; Yoshio Komine, both of Yokohama, and Ichiro Shimizu, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 10, 1975, Ser. No. 639,467
Claims priority, application Japan, June 10, 1975, 50-23170
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—04

244,934
MICROFILM READER
Stephen G. Hauser, Tarzana; Keith S. Keith, Topanga Canyon; Ralph M. Bergo, Thousands Oaks, and Robert T. DiSorbo, Mountain View, all of Calif., assignors to Stromberg Datagraphix, Inc.
Filed Sept. 25, 1975, Ser. No. 616,627
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—14

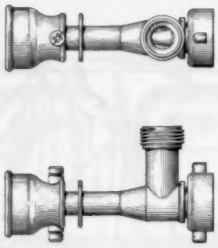
244,935
PAGE ALIGNER FOR AN OPEN BOOK OR THE LIKE
Loren C. Wheeler, 6182 Jellison Way, Arvada, Colo. 80004
Filed Oct. 14, 1975, Ser. No. 622,211
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—99

244,936
SPRINKLER
Ho Chow, River Edge, N.J., assignor to Beatrice Goods Co.
Filed Mar. 3, 1976, Ser. No. 663,465
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—7

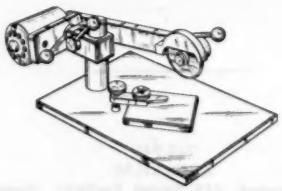




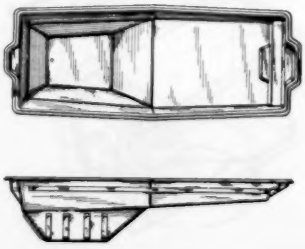
244,937
SYPHON
Le Roy M. Houk, Garden Grove, Calif., assignor to Wasco Products, Inc., Anaheim, Calif.
Filed Dec. 8, 1975, Ser. No. 638,738
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—40



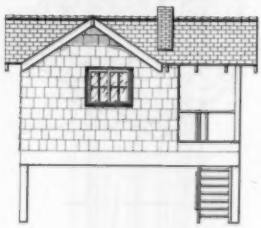
244,938
DENTAL SAW
Alfred A. Viazzoli, 14917 Rayen St., Panorama City, Calif. 91402
Filed Jan. 12, 1976, Ser. No. 648,497
Term of patent 7 years
Int. Cl. D24—*01*; D15—*09*
U.S. Cl. D24—8



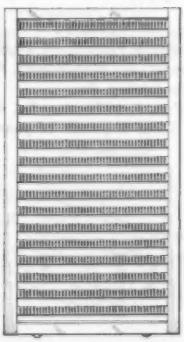
244,939
SWIMMING POOL LINER OR SIMILAR ARTICLE
Edgar G. Harman, 13875 W. 30th Place, Golden, Colo. 80401
Filed Oct. 3, 1975, Ser. No. 619,393
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—2



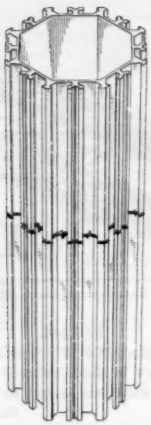
244,940
BUILDING
Thomas J. Brune, 6919 Pinehurst Drive, Evansville, Ind. 47711
Filed Feb. 11, 1976, Ser. No. 657,177
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—17



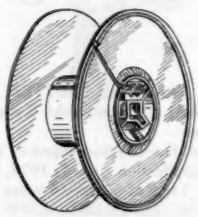
244,941
VENETIAN SHUTTER
Takeo Hashiba, 74-31, Shirahatanishi, Kanagawa, Yokohama, Kanagawa, Japan
Division of Ser. No. 241,864, April 6, 1972, Pat. No. D233,230. This application Aug. 7, 1974, Ser. No. 495,518
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—47



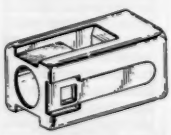
244,942
EIGHT-SIDED TUBULAR POST
Bertalan Tamas Bobrovniczky, Don Mills, Canada, assignor to Beautiline Systems Limited
Filed Jan. 7, 1976, Ser. No. 647,166
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—75



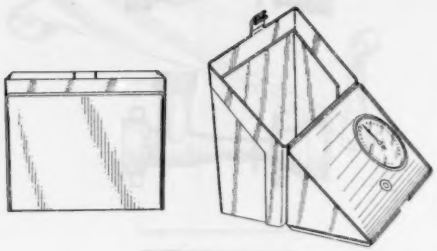
244,943
FILM REEL
James G. Balmer, Jr., Bloomfield Hills, Mich., assignor to Xerox Corporation, Stamford, Conn.
Filed Oct. 28, 1975, Ser. No. 626,390
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D14—10



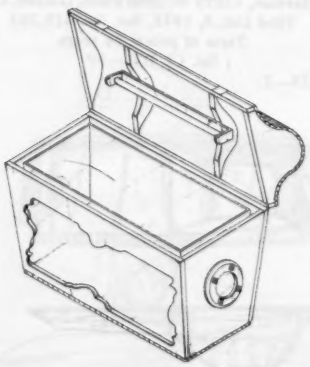
244,944
MOUNTING ADAPTOR FOR ELECTRICAL CONNECTOR
Dean Roosevelt Hooper, Jr., Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Feb. 3, 1976, Ser. No. 654,685
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—24



244,945
BLOOD PRESSURE TESTING KIT
John Cuccio, Westport, Conn., assignor to Sybron Corporation, Rochester, N.Y.
Filed Aug. 27, 1975, Ser. No. 608,087
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—21



244,946
AQUARIUM
Wiley Kit Kaywood, 445 Sunset Parkway, Novato, Calif. 94947
Continuation of Ser. No. 300,701, Oct. 25, 1972, abandoned. This application Jan. 27, 1975, Ser. No. 551,516
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6

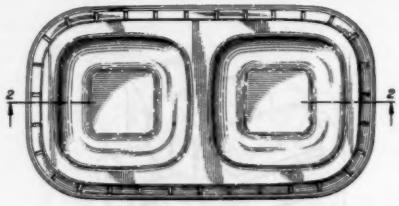


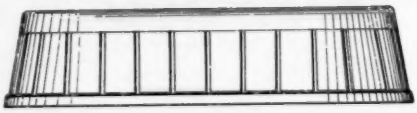
244,947

DUAL COMPARTMENT PET FEEDING DISH

William C. Gerber, 2867 Armstrong Drive, Wooster, Ohio 44691

Filed July 25, 1975, Ser. No. 599,125
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—16



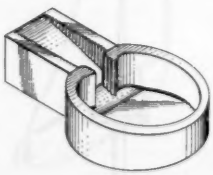


244,948

SELF-FEEDING PET FOOD BOWL

Robert D. Foley, Northridge, and Glynn C. Morris, Playa Del Rey, both of Calif., assignors to Carnation Company, Los Angeles, Calif.

Filed Feb. 19, 1976, Ser. No. 659,244
Term of patent 14 years
Int. Cl. D30—*03*
U.S. Cl. D30—16



244,949

SHELTER

Scott D. Welker, 1359 Winnette, Toledo, Ohio 43614

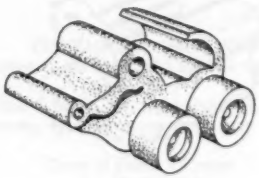
Filed Aug. 4, 1976, Ser. No. 711,532
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1

244,950

TOY WHEELED FIGURE

John F. McMahon, Boxford, Mass., assignor to General Mills Fun Group, Inc., Minneapolis, Minn.

Filed Jan. 2, 1976, Ser. No. 646,204
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

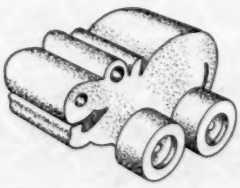


244,951

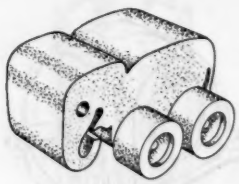
TOY WHEELED FIGURE

John F. McMahon, Boxford, Mass., assignor to General Mills Fun Group, Inc., Minneapolis, Minn.

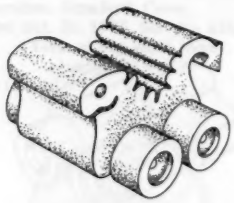
Filed Jan. 2, 1976, Ser. No. 646,205
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R



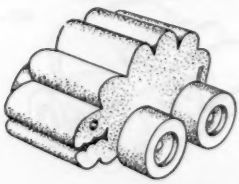
244,952
TOY WHEELED FIGURE
John F. McMahon, Boxford, Mass., assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed Jan. 2, 1976, Ser. No. 646,206
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R



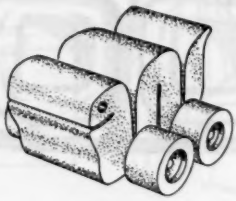
244,953
TOY WHEELED FIGURE
John F. McMahon, Boxford, Mass., assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed Jan. 2, 1976, Ser. No. 646,207
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R



244,954
TOY WHEELED FIGURE
John F. McMahon, Boxford, Mass., assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed Jan. 2, 1976, Ser. No. 646,208
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R

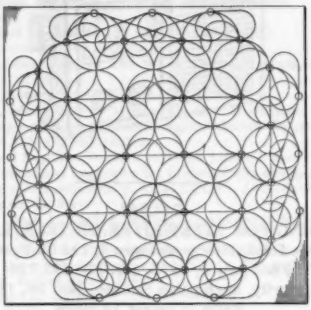


244,955
TOY WHEELED FIGURE
John F. McMahon, Boxford, Mass., assignor to General Mills Fun Group, Inc., Minneapolis, Minn.
Filed Jan. 2, 1976, Ser. No. 646,209
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 R



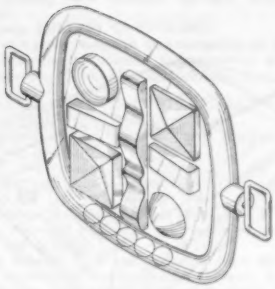
244,956
HOLE MARKING AND SCORING PIN FOR MINIATURE GOLF GAME
Erik Behrentz Kristiansen, 29, Rungsvej, DK-9200 Skalborg, Denmark
Filed Aug. 18, 1975, Ser. No. 605,336
Term of patent 3½ years
Int. Cl. D21—*01*
U.S. Cl. D34—5 NN

244,957
GAME BOARD
Marley A. Smith, 439 S. Main St., Miamisburg, Ohio 45342
Filed Dec. 29, 1975, Ser. No. 644,435
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5.55

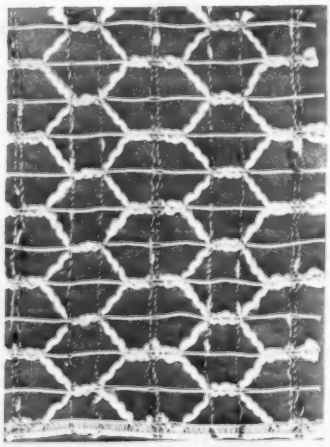


244,958
POOL TOY
Richard K. Bieser, Syosset, N.Y., assignor to Overman AB, Tranas, Sweden
Filed Oct. 30, 1975, Ser. No. 627,112
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 JJ

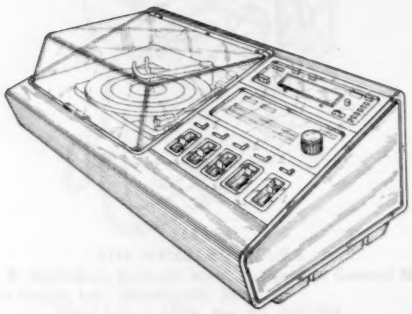
244,959
CRIB TOY
Matthew A. Moustakas, Mercerville, and Per O. Hoel, Plainsboro, both of N.J., assignors to CBS Inc., New York, N.Y.
Filed Mar. 25, 1976, Ser. No. 670,354
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 J



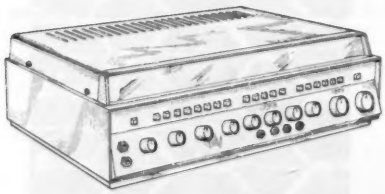
244,960
CURTAIN MATERIAL 587
Peter E. Schroeder, Am Falter 8, CH-8966 Oberwil, Switzerland
Filed Sept. 29, 1975, Ser. No. 617,674
Claims priority, application Germany, May 13, 1975, URA 289/75
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 R



244,961
COMBINED PHONOGRAPH AND STEREO RECEIVER
Melvin H. Boldt, Glenview; David P. Chuboff, North Barrington, and Wayne Franek, Palatine, all of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.
Filed Oct. 14, 1975, Ser. No. 621,908
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—5

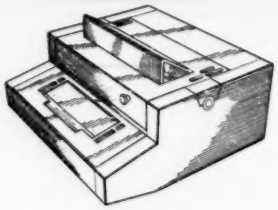


244,962
TUNER
Stuart Walter Sizer, Harbert, Mich., assignor to Heath Company, Benton Harbor, Mich.
Filed Oct. 28, 1975, Ser. No. 626,583
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—75

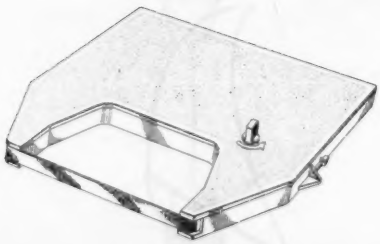


244,963
PORTABLE RADIO
Kunio Hoshino, Kadoma, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Dec. 17, 1975, Ser. No. 641,476
Claims priority, application Japan, June 20, 1975, 50-25267
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—70

244,964
HOUSING FOR TYPEWRITER OR TELEPRINTER
Berndt Ebbe Frick, Herrgardsvagen 9, 135 00 Tyreso, Sweden
Filed July 3, 1975, Ser. No. 592,720
Claims priority, application Sweden, Jan. 16, 1975, 75100
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D64—11 R



244,965
RIBBON CARTRIDGE
Richard D. Trezise, and James G. Savage, both of Newark, Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Aug. 22, 1975, Ser. No. 606,993
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 A



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PATENTS WERE ISSUED ON THE 5TH DAY OF JULY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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AB Bofors: *See—*
Eklund, John Folke; and Svensson, Sven-Hakan, 4,033,227, Cl. 89-34.000.

Ab Fi-Wes Maskinservice: *See—*
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AB Gustavsbergs Fabriker: *See—*
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Johnson, Edwin Samuel; and White, Wilfrid Francis, 4,034,082, Cl. 424-177.000.
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Abkowitz, Martin A.: *See—*
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Acda, Petrus Marinus, to Polva-Nederland B.V. Method of shaping a bell end on thermoplastic pipe. 4,034,057, Cl. 264-297.000.

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Tipton, Larry J., 4,034,029, Cl. 261-44.00R.

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Przygocki, Witold C., 4,033,497, Cl. 226-194.000.

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Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Alais, Pierre M., 4,034,332, Cl. 340-9.000.
Mailfert, Alain; and Renard, Michel, 4,034,245, Cl. 310-52.000.
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De Haes, Louis Maria; Vermeulen, Leon Louis; Gevers, Hugo Karel; and De Winter, Walter Frans, 4,033,770, Cl. 96-28.000.

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Klee, David J.; and Godtfring, Jack H., 4,033,140, Cl. 62-223.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Hirosawa, Koichiro; Ishikawa, Kazuo; Ogasawara, Tsunehiko; and Murakami, Noboru, 4,033,203, Cl. 74-869.000.
Inada, Masami; Kawabata, Yasuhiro; and Sato, Katsujiro, 4,033,125, Cl. 60-290.000.
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Akuta, Shinichiro: *See—*
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Eberius, Wiprecht; and Lorenz, Herbert, 4,034,034, Cl. 264-39.000.
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Alexandre, Arthur E. Holder for skis, ski poles and ski boots. 4,033,460, Cl. 211-60.0SK.

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Soderlund, Leif Ake, 4,033,295, Cl. 119-14.440.

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Allen, David William; and Borchert, Marshall Bond, to Tektronix, Inc. Electronic measuring instrument combining an oscilloscope and a digital multimeter. 4,034,291, Cl. 324-121.00R.

Allen & Hanburys Limited: *See—*
Bays, David Edmund; Peel, Mervyn Evan; Waters, David Martin; and Ellis, Gwynn Pennant, 4,034,075, Cl. 424-45.000.

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Curtis, Omer E., Jr.; Tuller, Harold W.; O'Neill, Charles T.; and Nussbaum, Ralph W., 4,034,014, Cl. 260-837.00R.
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Schulze, Stephen R., 4,033,939, Cl. 260-878.00R.

Allums, John Henry. Steel line measure guide. 4,033,041, Cl. 33-137.00R.

Allyn, Donald Cooper, to Boeing Company, The. Airfoil position range selecting, indicating and warning system for an aircraft. 4,034,334, Cl. 340-27.00R.

Almqvist, Sven-Olof; Enzell, Curt R.; Hjern, Lasse O.; Artho, Antoine; and Koch, Robert, to Svenska Tobaks AB; and F.J. Burrus & Cie. Filter for tobacco smoke. 4,033,362, Cl. 131-264.000.

Alpert, Louis, to United States of America, Navy. Underwater connector. 4,033,659, Cl. 339-60.00R.

Altair Tool & Engineering Inc.: *See—*
McCardell, Willard B., 4,033,663, Cl. 339-128.000.

Aluma Building Systems Incorporated: *See—*
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Alumax Mill Products, Inc.: *See—*
Lance, Richard T.; and Papafingos, Pandelis N., 4,033,760, Cl. 75-68.00R.

Aluminum Company of America: *See—*
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Amax Inc.: *See—*
Clark, Franklin F.; Nikolic, Cvetko B.; and Queneau, Paul B., 4,034,059, Cl. 423-144.000.

Ambrose, Peter C., Jr.; and Knapp, Ronald F., to United Technologies Corporation. Friction welding machine. 4,033,501, Cl. 228-2.000.

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Silva, Frank A.; and Mayer, Robert W., 4,034,151, Cl. 174-73.00R.

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Hutton, Robert Gordon; and Merry, Trevor, 4,033,059, Cl. 40-137.000.

American Can Company: *See—*
Beese, Ronald E., 4,033,274, Cl. 113-120.00A.

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American Carrier Equipment: *See—*
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 4,033,608, Cl. 280-711.000.

American Cyanamid Company: *See—*
Augurt, Thomas Anthony; Rosensaft, Michael Norman; and Perciaccante, Vincent Anthony, 4,033,938, Cl. 260-78.30R.

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Ferland, Jean-Marie; Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred K., 4,033,974, Cl. 260-295.50R.
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Givner, Morris Lincoln; and Schilling, Guenther, 4,033,723, Cl. 23-253.00R.
Philipp, Adolf H.; and Humber, Leslie G., 4,033,977, Cl. 260-302.00F.
Strike, Donald P.; and Kao, Wen-Ling, 4,034,002, Cl. 260-514.00D.
Strike, Donald Peter, 4,033,985, Cl. 260-340.900.

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Shoemaker, Arthur H., 4,033,666, Cl. 350-91.000.

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Glover, Douglas Wade; Askman, Jan Philip; and Herrmann, Henry Otto, Jr., 4,034,172, Cl. 200-51.100.
Koppenheffer, Gary Jay; and Rose, William Henry, 4,034,178, Cl. 200-293.000.
Lerner, Lewis Brian; and Davis, Thomas Francis, 4,033,835, Cl. 204-43.00S.
Wion, Donald Andrew; and Brown, Christopher Kingsley, 4,033,456, Cl. 206-347.000.

Ampex Corporation: *See—*
Trost, Allen J., 4,034,397, Cl. 358-8.000.

Amstutz, Jacob; and Amstutz, Paul G., to Jacob Amstutz. Hydraulically-powdered vehicle accessory system supercharged by hydraulic vehicle drive system. 4,033,127, Cl. 60-455.000.

Amstutz, Paul G.: *See—*
Amstutz, Jacob; and Amstutz, Paul G., 4,033,127, Cl. 60-455.000.

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Amundson, David Charles, to Cardiac Pacemakers, Inc. Electrode lead assembly for implantable devices and method of preparing same. 4,033,355, Cl. 128-404.000.

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Memishian, John, Jr., 4,034,366, Cl. 340-347.0AD.

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Anheuser-Busch, Incorporated: *See—*
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Bergquist, Arne Erik; and Westerberg, Sven Peter Jonas, 4,033,532, Cl. 248-17.000.
Atlas Industries, Inc.: *See—*
Stutzman, Howard A., 4,033,707, Cl. 417-312.000.
Atomic Energy of Canada Limited: *See—*
Bayly, John G.; and Booth, Ronald J., 4,033,699, Cl. 356-205.000.
Audio Visual Innovators Corporation: *See—*
Schoch, David K., 4,034,259, Cl. 315-93.000.
Augat, Inc.: *See—*
Ballew, George L., 4,033,031, Cl. 29-626.000.
Augurt, Thomas Anthony; Rosensaft, Michael Norman; and Perciaccante, Vincent Anthony, to American Cyanamid Company. Polymers of unsymmetrically substituted 1,4-dioxane-2,5-diones. 4,033,938, Cl. 260-78.30R.
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Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; and Castillo, Adolfo, 4,033,025, Cl. 29-417.000.
Automation Industries, Inc.: *See—*
Case, Dan Frank, 4,033,177, Cl. 73-67.900.
Ross, Harold B., 4,033,654, Cl. 339-143.00R.
Avalle, Angel C., to Raymond Lee Organization, Inc., The, a part interest. Latch closer in combination with a closed latch detector. 4,033,149, Cl. 66-111.000.
Aveneau, Andre A.; and de Passoz, Guy A., to Societe Anonyme de Telecommunications. Device for forming a bipolar signal of 50% duty cycle. 4,034,236, Cl. 307-261.000.
Avery, Ralph W., to General Electric Company. Commutator rounding brush. 4,034,249, Cl. 310-253.000.
Axelsson, Birger; and Rosby, Sven-Olof, to Aktiebolaget Svenska Flaktfabriken. Method and apparatus for cleaning fabric filters of bag type or the like. 4,033,732, Cl. 55-96.000.
Azam, Guy; and Boux, Rene, to C.G.R.-Mev. System for measuring radiation doses in radiotherapy apparatus. 4,034,222, Cl. 250-355.000.
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Oros, Richard G., 4,033,851, Cl. 204-302.000.
Babayan, Eduard P., to Hitco. Aromatic polyamide fibers coated with a polyurethane. 4,034,138, Cl. 428-378.000.
Babcock & Wilcox Company, The: *See—*
Holt, Amos E.; and Roseveare, Ronald N., 4,033,178, Cl. 73-71.5US.
Pinkstaff, Carlos Dean, 4,033,250, Cl. 100-53.000.
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Baehr, Edward F., to United States of America, National Aeronautics and Space Administration. Corneal seal device. 4,033,349, Cl. 128-303.00R.
Bailey, John V.: *See—*
Baron, Arthur L.; and Bailey, John V., 4,034,016, Cl. 260-858.000.
Baits, Stephen S., to Sundstrand Corporation. Emergency hydraulic power system (start bottle). 4,033,115, Cl. 60-39.09R.
Baker, Cyril Walter, to Cincinnati Milacron, Inc. Presses. 4,033,252, Cl. 100-99.000.
Baker, Jack H.: *See—*
List, Harold A.; Baker, Jack H.; and Joyce, Jack, 4,033,183, Cl. 73-88.50R.
Baker, Joseph E., to Olin Corporation. Metal anode assembly. 4,033,847, Cl. 204-250.000.
Bakewell, Joseph J., to Dynamics Research Corporation. Method of making a bi-metal screen for thick film fabrication. 4,033,831, Cl. 204-11.000.
Balanca, Charles; and Charles, Gilbert, to Commissariat a l'Energie Atomique. Device for automatic processing of signals recorded on an oscilloscope screen. 4,034,362, Cl. 340-347.0AD.
Baldyga, Eugene P., to Monsanto Company. Reclaiming waste plastics. 4,033,804, Cl. 156-84.000.
Ball Corporation: *See—*
Davis, Robert Earl, 4,033,744, Cl. 65-362.000.
Ballarin, Jurgen, to Bosch-Siemens Hausgerate GmbH. Refrigeration unit. 4,033,739, Cl. 62-202.000.
Ballew, George L., to Augat, Inc. Method and machine for inserting electrical contacts into electrical interconnection boards. 4,033,031, Cl. 29-626.000.
Balz, Werner: *See—*
Woellhaf, Josef; Balz, Werner; Falk, Roland; Scheffel, Dieter; Richter, Volker; and Willmann, Paul, 4,033,288, Cl. 118-52.000.
Balzer, David John, to Caterpillar Tractor Co. Brake control mechanism. 4,033,631, Cl. 303-50.000.
Bambury, Ronald E.: *See—*
Erickson, Raymond C.; and Bambury, Ronald E., 4,033,956, Cl. 260-243.00C.
Bangerskis, Karlis I.: *See—*
Harvey, Walter W.; Randlett, Myron R.; and Bangerskis, Karlis I., 4,033,839, Cl. 204-108.000.
Bank of America National Trust & Savings Association: *See—*
Carlson, Alvin R., 4,033,090, Cl. 53-78.000.
Bar-Ilan University: *See—*
Freund, Isaac, 4,034,226, Cl. 250-493.000.
Barash, David: *See—*
Schorsch, John B.; Graul, William E.; and Barash, David, 4,033,142, Cl. 62-381.000.
Barber, Herbert Douglas; and Salter, Gary Curtis, to Linear Technology Inc. D.C. amplifier for use with low supply voltage. 4,034,306, Cl. 330-30.00D.
Barcell, Ernest A.; and Pusch, James L., to Easy Engineering Corporation. Method and apparatus for reducing hammermill slugging for livestock feed grinders and the like. 4,033,515, Cl. 241-27.000.
Barcza, Sandor; and Hendrickson, James B., to Sandoz, Inc. 2,4-Disubstituted-4b,5,6,7,8,8a,9,10-octahydro-9-oxo-phenanthrenes. 4,034,045, Cl. 260-590.0FB.
Bardocz, Arpad. Optical rail system. 4,033,539, Cl. 248-228.000.
Bareth, Erich; and Loge, Hans, to Kaltenbach & Voigt. Clamping device for dental tools. 4,033,040, Cl. 32-27.000.
Bargain, Michel; and Pasquini, Zeno, to Rhone Poulenc S.A. Partially crosslinked silalactone polymers, their preparation and their use. 4,033,731, Cl. 55-16.000.
Barker, Alfred Walter: *See—*
Priest, Anthony Victor Norton; and Schorr, Murray Arnold, 4,033,132, Cl. 60-572.000.
Barley, Thomas A.: *See—*
Ashley, James R.; Barley, Thomas A.; and Rast, Gustaf J., Jr., 4,034,285, Cl. 324-57.00R.
Barnard, Alfred J., Jr.; and Lance, Russell C., Jr., to J. T. Baker Chemical Company. Flash point determination calibration standards. 4,033,897, Cl. 252-408.000.
Baron, Arthur L.; and Bailey, John V., to Mobay Chemical Corporation. Ternary polyblends prepared from polybutylene terephthalates, polyurethanes and aromatic polycarbonates. 4,034,016, Cl. 260-858.000.
Baron, Gerhard; Hafke, Carl; Engler, Dietrich; Reimert, Rainer; and Blaum, Eberhard, to Metallgesellschaft Aktiengesellschaft. Process and apparatus for feeding particulate solids into a pressure reactor. 4,033,730, Cl. 48-86.00R.
Baron, Joseph J., Jr.; and Krefting, Sherman, to Diamond Shamrock Corporation. Synthetic sizes. 4,033,922, Cl. 260-29.6RW.
Barr, Douglas, to Engineered Safety Products, Inc. Support for life ring and associated retrieval line. 4,033,276, Cl. 114-190.000.
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Wallin, Erik W., 4,034,375, Cl. 343-18.00A.
Barrett, George M. Fluid carrier recovery system and method. 4,033,412, Cl. 166-267.000.
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Payrhammer, Bernd; Bartel, Siegfried; and Besigk, Geert, 4,033,693, Cl. 355-71.000.
Barton, Paul, to International Standard Electric Corporation. Radio direction finder with array element signal processing. 4,034,376, Cl. 343-112.00R.
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Basiulis, Algred, to Hughes Aircraft Company. Heat exchanger utilizing heat pipes. 4,033,406, Cl. 165-32.000.
Bastian, Jean-Michel, to Sandoz Ltd. Benzo[5,6]cyclohepta[1,2-c]pyridines. 4,034,095, Cl. 424-256.000.
Bates, Danny E., to Phillips Petroleum Company. Test apparatus and method. 4,034,195, Cl. 235-153.0AC.
Bauer, Wolfgang; Krusche, Erwin; and Ribka, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. Water-soluble trisazo 8-amino-naphthol-1 dyes. 4,033,945, Cl. 260-157.000.
Baumgartner, Charles E.; and Bihuniak, Peter P., to Corning Glass Works. Method of enhancing the refractoriness of high purity fused silica. 4,033,780, Cl. 106-69.000.
Baumgartner, Friedrich: *See—*
Weiss, Franz; Baumgartner, Friedrich; and Zach, Werner, 4,033,514, Cl. 239-662.000.
Bayer Aktiengesellschaft: *See—*
Daum, Werner; Brandes, Wilhelm; and Frohberger, Paul-Ernst, 4,034,104, Cl. 424-289.000.
Goebel, Hermann, 4,033,946, Cl. 260-166.000.
Hoffmann, Hellmut; and Hammann, Ingeborg, 4,034,085, Cl. 424-200.000.
Kleimann, Helmut; and von Bonin, Wulf, 4,033,912, Cl. 260-2.5AH.
Priemer, Joachim; Schenk, Norbert; Krekel, Jorg; and Schwerdtel, Wulf, 4,033,987, Cl. 260-346.400.

Seng, Florin; and Ley, Kurt, 4,033,960, Cl. 260-250.0QN.
Wedemeyer, Karlfried; and Helm, Rudolf, 4,034,042, Cl. 260-576.000.
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 4,033,964, Cl. 260-268.00C.

Bayliss, John Patrick, to Girling Limited. Retainer mechanism for vehicle brake actuators. 4,033,435, Cl. 188-173.000.

Bayly, John G.; and Booth, Ronald J., to Atomic Energy of Canada Limited. Vapor concentration monitor. 4,033,699, Cl. 356-205.000.

Bays, David Edmund; Peel, Mervyn Evan; Waters, David Martin; and Ellis, Gwynn Pennant, to Allen & Hanburys Limited. Quinaldic acid derivatives. 4,034,075, Cl. 424-45.000.

BBC Brown Boveri & Company Limited: *See*—
Zaugg, Paul, 4,033,114, Cl. 60-39.020.

Beacham, Harry Hoyt: *See*—
Wright, Carl Leonard; and Beacham, Harry Hoyt, 4,034,136, Cl. 428-246.000.

Beatty, Jerry Lon: *See*—
Louden, Lester Richard; Blessington, Clement Auguston; and Beatty, Jerry Lon, 4,034,219, Cl. 250-301.000.

Beavers, John Andrew, to Borg-Warner Corporation. Tandem thrust bearing. 4,033,647, Cl. 308-227.000.

Beck, Jacob Howard, to BTU Engineering Corporation. Heat processing system. 4,033,715, Cl. 432-4.000.

Beck, Louis. Nozzle assemblies for atomizing and mixing different fluids and combining the mixture with solids and the like. 4,033,512, Cl. 239-423.000.

Bedi, Ram D., to Eaton Corporation. Self-locking fastener. 4,033,393, Cl. 151-14.500.

Beecham Group Limited: *See*—
Bentley, Peter Hubert; and Clayton, John Peter, 4,033,979, Cl. 260-306.70C.

Beery, Jack, to Burroughs Corporation. System for extending the life of a pin printer using pin shifting. 4,033,444, Cl. 197-1.00R.

Beese, Ronald E., to American Can Company. Containers. 4,033,274, Cl. 113-120.00A.

Beffa, Fabio; Back, Gerhard; and Steiner, Eginhard, to Ciba-Geigy AG. Chromium complex dye, including azo and azo methine dye compounds. 4,033,942, Cl. 260-145.00A.

Begrich, Rainer, to Ciba-Geigy Corporation. Fibre-reactive hydroxycycloalkenyl-halo triazinyl containing dyestuffs. 4,033,944, Cl. 260-153.000.

Behling, Hans Heinrich: *See*—
de Pierre, Richard; Forgays, Gilbert Jerome; Behling, Hans Heinrich; and Curtis, William Childs, 4,034,373, Cl. 343-7.700.

Behringwerke Aktiengesellschaft: *See*—
Helting, Torsten Bertil, 4,033,819, Cl. 195-29.000.
Karges, Hermann Erich; Heimburger, Norbert; and Jacobi, Eckart, 4,033,824, Cl. 195-99.000.

Beiersdorf Aktiengeseilschaft: *See*—
Hauber, Rudiger, 4,033,918, Cl. 260-29.6WB.

Belaco International Ltd.: *See*—
Nevai, Bela B., 4,033,461, Cl. 211-86.000.

Bell & Howell Company: *See*—
Kim, Raymond W. H., 4,033,681, Cl. 352-173.000.
Pasturczak, Vincent S., 4,033,680, Cl. 352-124.000.

Bell Telephone Laboratories, Incorporated: *See*—
Alexander, Frank Bernard, Jr.; Capio, Cesar Deduyo; Hauser, Victor Emerald, Jr.; Levinstein, Hyman Joseph; Mogab, Cyril Joseph; Sinha, Ashok Kumar; and Wagner, Richard Siegfried, 4,033,287, Cl. 118-49.10R.
Berreman, Dwight Winton, 4,033,671, Cl. 350-160.0LC.
Blank, Stuart Lawrence, 4,034,358, Cl. 340-174.0TF.
Dalley, James Edwin, 4,034,294, Cl. 325-38.00R.
Fair, Richard Barton; Hayes, John Saylor; and Rosser, William Morgan, 4,033,027, Cl. 29-583.000.
Fleming, James William, Jr., 4,033,667, Cl. 350-96.0WG.
Holt, James Tyler, 4,034,162, Cl. 179-18.0AB.
Hoppough, Richard Scott, 4,034,161, Cl. 179-18.0AB.
Lawrence, Victor Bernard; and Mina, Kent Vincent, 4,034,197, Cl. 235-156.000.
May, Carl Jerome, Jr., 4,034,302, Cl. 328-39.000.
Ohm, Edward Allen, 4,034,378, Cl. 343-781.0CA.
Presby, Herman Melvin, 4,033,668, Cl. 350-96.00C.
Probert, Geoffrey, Jr., 4,034,347, Cl. 364-200.000.

Bendix Corporation, The: *See*—
Gardner, Delbert J., 4,033,131, Cl. 60-553.000.
Henrich, Robert Samuel, 4,033,272, Cl. 123-117.00R.
Menin, Albert S.; and Bridges, Robert M., 4,034,331, Cl. 340-3.00R.
Schuster, Robert W., 4,033,112, Cl. 60-39.28R.
Simmons, Richard W., 4,034,354, Cl. 364-900.000.

Benesh, Peter: *See*—
Gregory, Ralph R.; and Benesh, Peter, 4,033,329, Cl. 128-2.00S.

Benford, Howard L.: *See*—
Smith, Robert H.; and Benford, Howard L., 4,033,605, Cl. 280-664.000.

Bengtsson, Goran Vilhelm. Filter device. 4,033,880, Cl. 210-424.000.

Benjamin, Benjamin C.; and Schautz, Glenn A., to Schmelzer Corporation. Charge forming device. 4,033,232, Cl. 91-47.000.

Bennett, Bruce A., to Creative Innovations. Motorcycle lock. 4,033,159, Cl. 70-233.000.

Bennett, Richard H.; Klock, Byron V.; and Brockington, James W., to Texaco Inc. Alkylation fluosulfonic-sulfuric acid catalyst recovery process with silica-alumina removal of fluoride compounds. 4,033,899, Cl. 252-420.000.

Bennett, William O.; and Sagarino, Robert F., to Bulova Watch Company, Inc. Automatic cut-off setting system for LED display in a solid-state watch. 4,033,108, Cl. 58-50.00R.

Benning, Vernon A., to M. L. Aviation Company Limited. Apparatus for manoeuvring aircraft. 4,033,422, Cl. 180-14.00C.

Benoit, Roland A.; and Duprey, Richard H., to Interroyal Corporation. Drawer slide. 4,033,639, Cl. 308-3.600.

Benson, William. Aerodynamic flow body. 4,033,526, Cl. 244-15.000.

Bentley, Arthur P. Heat engine. 4,033,134, Cl. 60-641.000.

Bentley, Peter Hubert; and Clayton, John Peter, to Beecham Group Limited. Organic compounds. 4,033,979, Cl. 260-306.70C.

Bently, Donald E., to Bently Nevada Corporation. Shaft alignment apparatus and method. 4,033,042, Cl. 33-181.00R.

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Bently, Donald E., 4,033,042, Cl. 33-181.00R.

Berenson, Walter Louis; and Taylor, Ronald Wayne, to Motorola, Inc. Omni-frequency pilot system. 4,034,296, Cl. 325-62.000.

Berg, Daniel T.: *See*—
Berg, Winfred M.; and Berg, Daniel T., 4,033,395, Cl. 152-323.000.

Berg, Lawrance F., to Caterpillar Tractor Co. Fluid operated ram. 4,033,235, Cl. 91-396.000.

Berg, Winfred M.; and Berg, Daniel T. Continuous plastic tire body and tire. 4,033,395, Cl. 152-323.000.

Berger, Abe, to Berger, Abe; Adam, Gerhard K.; and Stonkus, John. Alkenyl thioalkyl silicones and method of preparation. 4,033,934, Cl. 260-46.50G.

Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, to Rhone-Poulenc Industries. Cephalosporin derivatives, and compositions containing them. 4,034,088, Cl. 424-246.000.

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Berger, Herbert: *See*—
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Berger, Horst: *See*—
Schlosser, Werner; and Berger, Horst, 4,034,182, Cl. 219-121.0EM.

Berges, David A., to SmithKline Corporation. 7-Acyl-3-(carboxyalkyl and carbamoylalkyl substituted oxadiazolylthiomethyl) cephalosporins. 4,034,092, Cl. 424-246.000.

Bergkvist, Hakan Georg Frithiof. Positioning device for tubes to be embedded in surrounding cast material. 4,033,534, Cl. 248-49.000.

Bergquist, Arne Erik; and Westerberg, Sven Peter Jonas, to Atlas Copco Aktiebolag. Power tool support. 4,033,532, Cl. 248-17.000.

Bernard, Armand R.: *See*—
Thary, Christian; Bernard, Armand R.; Labadie, Jean Francois; and De La Taille, Olivier P., 4,033,623, Cl. 297-390.000.

Bernstein, Bertram J. Crankcase oil drainage and containment apparatus. 4,033,432, Cl. 184-1.500.

Bernstein, Jack: *See*—
Hoehn, Hans; Bernstein, Jack; and Vogt, Berthold Richard, 4,033,970, Cl. 260-293.610.

Berreman, Dwight Winton, to Bell Telephone Laboratories, Incorporated. Liquid crystal twist cells. 4,033,671, Cl. 350-160.0LC.

Berry, Brian S.; and Pritchet, Walter C., to International Business Machines Corporation. Method for inducing uniaxial magnetic anisotropy in an amorphous ferromagnetic alloy. 4,033,795, Cl. 148-108.000.

Berry, James M., to Teletype Corporation. Ink jet writing process and apparatus. 4,034,379, Cl. 346-1.000.

Bertelli, Guido; Roma, Pierpaolo; and Longi, Paolo, to Montedison Fibre S.p.A. Flame-extinguishing polyolefin compositions. 4,033,915, Cl. 260-28.50A.

Bertone, Antonino; Rivetti, Enrico; and Cattaneo, Maurizio, to Fiat Societa per Azioni. Hydro-dynamic anti-skid braking systems. 4,033,638, Cl. 303-116.000.

Besigk, Geert: *See*—
Payrhammer, Bernd; Bartel, Siegfried; and Besigk, Geert, 4,033,693, Cl. 355-71.000.

Besik, Ferdinand, to Ontario Research Foundation. Waste water treatment apparatus. 4,033,875, Cl. 210-197.000.

Bestel, John Louis; Haynes, Richard; and Srinivasan, Venkataraman, to Western Electric Company, Inc. Method of selectively electroplating an area of a surface. 4,033,833, Cl. 204-15.000.

Bestenreiner, Friedrich; and Giglberger, Dieter, to AGFA-Gevaert, Aktiengesellschaft. Method and arrangement for preventing sheets from charring in copying machines. 4,034,186, Cl. 219-216.000.

Bethlehem Steel Corporation: *See*—
List, Harold A.; Baker, Jack H.; and Joyce, Jack, 4,033,183, Cl. 73-88.50R.

Bethmann, Heinz G.; Kilguss, Heinz; and Simon, Horst, to Eastman Kodak Company. Exposure control apparatus having two exposure time setting positions. 4,034,391, Cl. 354-289.000.

Bettencourt, Thomas S.: *See*—
Friedel, William C., Jr.; Bettencourt, Thomas S.; and Freeman, Daniel L., 4,033,099, Cl. 56-327.00R.

Betts, Robert E.; Thorn, Lawrence B.; and Maykut, Albert R., to United States of America, Army. Noise controllable nozzle closure. 4,033,121, Cl. 60-271.000.

Betz Laboratories, Inc.: *See—*
Jacques, Donald F.; and Lange, K. Robert, 4,033,867, Cl. 210-28.000.

Bevilacqua, Leno L. Operating condition signal light for an automotive vehicle. 4,034,338, Cl. 340-66.000.

Bewley, William L.; and Wilkinson, Herbert F., deceased (by Wilkinson, Alice E., executrix), to Union Oil Company of California. Dual cylinder rotating solids feeder and method. 4,033,467, Cl. 214-23.000.

Bex, Hans, to U.S. Philips Corporation. Circuit arrangement in strip line technique for a wide band balancing element. 4,034,316, Cl. 333-11.000.

Bezzerides, Paul A.; Bezzerides, Robert A.; and Vradenburg, Dave W. Agricultural soil chemical incorporator. 4,033,270, Cl. 111-6.000.

Bezzerides, Robert A.: *See—*
Bezzerides, Paul A.; Bezzerides, Robert A.; and Vradenburg, Dave W., 4,033,270, Cl. 111-6.000.

Bichler, Peter: *See—*
Tybus, Gerd; Ebner, Ludwig; Waldhoer. Rudolf; Bichler, Peter; Bier, Wilhelm; Happe, Peter; and Weis, Frowald, 4,033,021, Cl. 29-157.00C.

Bickerdike, Robert Lewis; Clark, Douglas; Eastabrook, John Norman; Hughes, Garyth; Mair, William Norman; Partridge, Peter George; and Ranson, Harry Christopher, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Aluminium alloys. 4,033,793, Cl. 148-32.000.

Bieniosek, Chester E.; Kachik, Robert H.; and Pignocco, Arthur J., to United States Steel Corporation. Method for cladding copper and copper alloys to steel substrates. 4,033,399, Cl. 164-54.000.

Bier, Wilhelm: *See—*
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Bierworth, David P.; and Lynch, Thomas, to Xerox Corporation. Variable magnification reproducing apparatus. 4,033,691, Cl. 355-11.000.

Bihuniak, Peter P.: *See—*
Baumgartner, Charles E.; and Bihuniak, Peter P., 4,033,780, Cl. 106-69.000.

Biller, Horst; and Huls, Friedrich, to Mannesmannrohren-Werke AG. Method for rolling tubes. 4,033,164, Cl. 72-205.000.

Birchenough, Arthur G., to United States of America, National Aeronautics and Space Administration. Sustained arc ignition system. 4,033,316, Cl. 123-148.00E.

Bishop, Roland Justin, Jr.: *See—*
Kasai, Paul Haruo; Francis, James Nelson; and Bishop, Roland Justin, Jr., 4,034,065, Cl. 423-328.000.

Black and Decker Manufacturing Company, The: *See—*
Chester, Nelson Sherwood; Laughon, Thomas Cecil; and Sindelar, William Frank, 4,033,077, Cl. 51-170.00T.

Blackwell Burner Company: *See—*
Lohman, John H.; and Brooke, Richard C., 4,033,328, Cl. 126-343.50A.

Blake, James David: *See—*
Blake, Robert L.; and Blake, James David, 4,033,620, Cl. 296-24.00C.

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Sheldrake, Charles Peter Hedley; and Blake, Timothy Gunton, 4,034,398, Cl. 358-60.000.

Blank, Stuart Lawrence, to Bell Telephone Laboratories, Incorporated. Magnetic bubble devices with controlled temperature characteristics. 4,034,358, Cl. 340-174.0TF.

Blaum, Eberhard: *See—*
Baron, Gerhard; Hafke, Carl; Engler, Dietrich; Reimert, Rainer; and Blaum, Eberhard, 4,033,730, Cl. 48-86.00R.

Blessington, Clement Auguston: *See—*
Louden, Lester Richard; Blessington, Clement Auguston; and Beatty, Jerry Lon, 4,034,219, Cl. 250-301.000.

Bloink, Harry William, to Illinois Tool Works Inc. Indexable milling cutter. 4,033,018, Cl. 29-105.00A.

Bloom, Allen; and Ross, Daniel Louis, to RCA Corporation. Method for increasing the conductivity of electrically resistive organic materials. 4,033,905, Cl. 252-500.000.

Blount, David H. Process for the production of amino silicate compounds and their condensation products. 4,033,935, Cl. 260-67.60R.

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Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,033,967, Cl. 260-287.0CF.
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Allyn, Donald Cooper, 4,034,334, Cl. 340-27.00R.

Bogan, Robert T. Shutter, grille or the like. 4,033,073, Cl. 49-38.000.

Bolden, Edward J., to Raymond Lee Organization, Inc., The, a part interest. Speaker enclosure. 4,033,430, Cl. 181-144.000.

Boliden Aktiebolag: *See—*
Nilsson, Bruno Yngve, 4,034,279, Cl. 320-20.000.

Bollert, Ulrich; Lohmar, Elmar; and Ohorodnik, Alexander, to Hoechst Aktiengesellschaft. Process for the manufacture of flame retarding linear polyesters. 4,033,936, Cl. 260-75.00P.

Bolza, Frederick; Sadek, Lubos Vojtech; and Fox, Richard, to ICI Australia Limited. Explosive cartridge. 4,033,264, Cl. 102-24.00R.

Bonifay, Andre. Functional stretcher shell device. 4,033,000, Cl. 5-82.00R.

Boodman, Norman S.; and Weil, Richard C., to United States Steel Corporation. Tar acid products from solvent naphtha. 4,034,048, Cl. 260-621.00H.

Booth, Ronald J.: *See—*
Bayly, John G.; and Booth, Ronald J., 4,033,699, Cl. 356-205.000.

Borchert, Marshall Bond: *See—*
Allen, David William; and Borchert, Marshall Bond, 4,034,291, Cl. 324-121.00R.

Borden, Inc.: *See—*
Krueger, Bruno O., 4,034,062, Cl. 423-219.000.

Borg-Warner Corporation: *See—*
Beavers, John Andrew, 4,033,647, Cl. 308-227.000.
Warner, John C., 4,033,145, Cl. 64-21.000.

Borman, Willem F. H., to General Electric Company. Flame retardant polyester resin compositions. 4,033,927, Cl. 260-45.70P.

Borthwick, James; and Morman, James Forrester, to Imperial Chemical Industries Limited. Smoking mixture. 4,033,359, Cl. 131-17.0AC.

Borton, Gary L.; Goff, Cobb S.; and Malloy, Richard J., to Eastman Kodak Company. Stabilized bleach-fixing baths. 4,033,771, Cl. 96-60.0BF.

Bos Kalis Westminster Group N.V.: *See—*
Demmers, Arie Adolf, 4,033,056, Cl. 37-73.000.

Bosch-Siemens Hausgerate GmbH: *See—*
Ballarin, Jurgen, 4,033,739, Cl. 62-202.000.

Bouder, Paul C., to Etablissements Poutrait-Morin. Toe clip for pedals. 4,033,199, Cl. 74-594.600.

Boudreau, Robert J., to Hedstrom Co. Infant's car seat. 4,033,622, Cl. 297-250.000.

Boulanger, Henry J.: *See—*
Ehlers, Brian C.; and Boulanger, Henry J., 4,034,234, Cl. 307-116.000.

Bourgeois, Armand E., to Sanders Associates, Inc. Drogue release apparatus. 4,033,529, Cl. 244-151.00B.

Bouwhuis, Gijsbertus: *See—*
Compaan, Klaas; and Bouwhuis, Gijsbertus, 4,034,403, Cl. 358-128.000.

Boux, Rene: *See—*
Azam, Guy; and Boux, Rene, 4,034,222, Cl. 250-355.000.

Bovier, Edward M.; and Voigt, John E., to Anheuser-Busch, Incorporated. Water resistant corrugating adhesive containing aminohydroxy compound. 4,033,914, Cl. 260-17.200.

Bowman, Harold M. Fire hydrant locking device. 4,033,372, Cl. 137-296.000.

Boyd, Albert E. Telephone switch retaining device. 4,034,167, Cl. 179-178.000.

Boyer, Ambroise O. Apparatus for carrying glass panels. 4,033,597, Cl. 280-46.000.

Bracey, Jep T., to Towler, Martin L. Oxygenation impregnation apparatus. 4,034,030, Cl. 261-64.00D.

Bradshaw, Janice: *See—*
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 4,033,950, Cl. 260-243.00C.

Brady, John F.: *See—*
Czernik, Daniel E.; and Brady, John F., 4,033,005, Cl. 14-16.100.

Bram, Georges Eugene, to Pont-A-Mousson S.A. Locked joint between two pipe elements capable of having an angular deviation with respect to each other. 4,033,613, Cl. 285-184.000.

Brammer, Hartmut G.: *See—*
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, 4,033,315, Cl. 123-146.50A.

Brand, Gunter: *See—*
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, 4,033,315, Cl. 123-146.50A.

Brander, James Edward, to International Combustion Australia Limited. Vibratory drive unit. 4,033,193, Cl. 74-61.000.

Brandes, Wilhelm: *See—*
Daum, Werner; Brandes, Wilhelm; and Frohberger, Paul-Ernst, 4,034,104, Cl. 424-289.000.

Brantley, Lott W., Jr.; and Rood, Robert W. Pressure-shaped reflector apparatus. 4,033,676, Cl. 350-295.000.

Braun Aktiengesellschaft: *See—*
Gahler, Egon; Heintke, Hans Eberhard; and Dietrich, Rolf, 4,034,278, Cl. 320-1.000.

Braun, Anton: *See—*
Lohn, Gerd; and Braun, Anton, 4,033,039, Cl. 32-26.000.

Braun, Franz. Electrostatic coating guns. 4,033,506, Cl. 239-15.000.

Braunschweigische Maschinenbauanstalt: *See—*
Natt, Peter; and Kurland, Heinrich, 4,033,879, Cl. 210-369.000.

Bregeon, Louis; Dupuy, Gerard; Lerouge, Bernard; and Schwartz, Jean-Pierre, to Commissariat a l'Energie Atomique. Thermogenic swimming-pool type nuclear reactor. 4,033,814, Cl. 176-63.000.

Brenner, William C.: *See—*
Mole, Cecil J.; and Brenner, William C., 4,034,248, Cl. 310-178.000.

Bresie, Don. Method and apparatus for down hole pressure and temperature measurement. 4,033,186, Cl. 73-154.000.

Brewer, Robert A. Harness article carrier. 4,033,488, Cl. 224-5.00V.

Brian, Jack, to Hughes Aircraft Company. Video scrambling system. 4,034,402, Cl. 358-114.000.

Brice, Marilyn J., executrix: *See—*
Brice, Neil M., deceased; and Brice, Marilyn J., executrix, 4,033,524, Cl. 244-158.000.

Brice, Neil M., deceased; and by Brice, Marilyn J., executrix. Method and apparatus for controlling earth orbiting satellites and vehicles inter alia. 4,033,524, Cl. 244-158.000.

Bridges, Robert M.: *See—*
Menin, Albert S.; and Bridges, Robert M., 4,034,331, Cl. 340-3.00R.

Briedis, Juozas; and Jurisch, Louis A., to IMC Chemical Group, Inc. Copper-oxazoline complex. 4,033,976, Cl. 260-299.000.

Briles Manufacturing: *See—*
Marroquin, Emilio R., 4,033,003, Cl. 10-10.00R.

Brill, Henry; and Yee, Peter, to Bulova Watch Company, Inc. Electro-optical bar-code scanning unit. 4,034,230, Cl. 250-568.000.

Briska, Marian; and Eisenbraun, Ewald, to International Business Machines Corporation. Method of growing pyrolytic silicon dioxide layers. 4,034,130, Cl. 427-248.00C.

Bristol-Myers Company: *See—*
Kaplan, Murray Arthur; and Granatek, Alphonse Peter, 4,034,089, Cl. 424-246.000.

British Aluminum Company, Limited, The: *See—*
Stowell, Michael James; Watts, Brian Michael; Emley, Edward Frederick; and Grimes, Roger, 4,033,794, Cl. 148-32.000.

Britton, Berdette O. Quadraphonic passive four-channel decoder. 4,034,158, Cl. 179-1.0GQ.

Brock, James Donald: *See—*
Chazen, Julius L.; and Brock, James Donald, 4,033,458, Cl. 209-11.000.

Brockington, James W.: *See—*
Bennett, Richard H.; Klock, Byron V.; and Brockington, James W., 4,033,899, Cl. 252-420.000.

Brodman, Bruce W.; Devine, Michael P.; and Schwartz, Stuart, to United States of America, Army. Complex of nitrocellulose as propellant. 4,033,798, Cl. 149-92.000.

Brodmann, Franz J.; and Varker, Richard D., to General Refractories Company. Method for making lime-silica insulation from perlite. 4,033,783, Cl. 106-120.000.

Brodsky, Larry: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; and Castillo, Adolfo, 4,033,025, Cl. 29-417.000.

Brolund, Theodore F.; and Helgert, James F., to W. A. Whitney Corporation. Duplicating punch press with stylus control. 4,033,216, Cl. 83-413.000.

Brooke, Richard C.: *See—*
Lohman, John H.; and Brooke, Richard C., 4,033,328, Cl. 126-343.50A.

Brookline Instrument Company, Inc.: *See—*
De Masters, James J., 4,033,420, Cl. 177-126.000.

Brouillard, Robert Ernest, to Penick & Ford, Limited. Starch sponge column apparatus and process for immobilized enzyme reactions. 4,033,820, Cl. 195-31.00R.

Brown, Christopher Kingsley: *See—*
Wion, Donald Andrew; and Brown, Christopher Kingsley, 4,033,456, Cl. 206-347.000.

Brown, Harvey A., to Minnesota Mining and Manufacturing Company. Acutance agents for use in thermally-developable photosensitive compositions. 4,033,948, Cl. 260-240.00A.

Brown, Robert Kenneth. Device to detect and automatically control electrical potential polarities. 4,034,168, Cl. 191-2.000.

Brown, Wilburn Kelly, to Pettibone Corporation. Hydraulic boom-lift system with selective speeds. 4,033,468, Cl. 214-130.00R.

Brown & Williamson Tobacco Corporation: *See—*
Horsewell, Henry George; and Harris, Ian Richard, 4,033,361, Cl. 131-262.00A.
Rusk, Thomas P., 4,033,283, Cl. 118-1.000.

Browning, John H. D.: *See—*
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., 4,033,994, Cl. 260-468.00R.

Brubaker, Hiram A.: *See—*
Goloff, Alexander; and Brubaker, Hiram A., 4,033,231, Cl. 90-24.300.

Brunet, Michel: *See—*
Seigneurin, Laurent; and Brunet, Michel, 4,034,067, Cl. 423-462.000.

Brunnetti, Heimo: *See—*
Lind, Hanns; Rody, Jean; and Brunnetti, Heimo, 4,034,006, Cl. 260-521.00C.

Bruns, Klaus; and Meins, Peter, to Henkel & Cie G.m.b.H. Cycloalkyl carbonates. 4,033,993, Cl. 260-463.000.

Bryan, Jack T., to Upjohn Company, The. Compositions and method for treating mastitis in milk animals. 4,034,099, Cl. 424-271.000.

BTU Engineering Corporation: *See—*
Beck, Jacob Howard, 4,033,715, Cl. 432-4.000.

Buchel, Karl Heinz: *See—*
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 4,033,964, Cl. 260-268.00C.

Buchholz, Reinhard: *See—*
Marquardt, Kurt; and Buchholz, Reinhard, 4,033,874, Cl. 210-189.000.

Buinicky, Ernest P.; Durkin, Joseph A.; and Estes, John H., to Texaco Inc. Shaped, bonded boride catalysts. 4,033,901, Cl. 252-432.000.

Bulanda, John J.: *See—*
Moody, Roy A.; and Bulanda, John J., 4,033,661, Cl. 339-98.000.

Buller, Richard James: *See—*
Fritz, David Paul; Anderson, John Dale; Pruitt, Martin Eugene; Mahagan, Deroy Ernest; and Buller, Richard James, 4,033,101, Cl. 56-344.000.

Bulova Watch Company, Inc.: *See—*
Bennett, William O.; and Sagarino, Robert F., 4,033,108, Cl. 58-50.00R.
Brill, Henry; and Yee, Peter, 4,034,230, Cl. 250-568.000.
Sagarino, Robert F., 4,033,110, Cl. 58-88.00R.

Bulvanoski, Leo James: *See—*
DiMartini, Carl Richard; Scott, William Lafayette; and Bulvanoski, Leo James, 4,033,761, Cl. 75-77.000.

Bundy, Gordon L., to Upjohn Company, The. 9-Deoxy-PGF$_2$ Analogs. 4,033,989, Cl. 260-408.000.

Bunge, Ernst; Rothgordt, Ulf; Ehlers, Bernd; and Piotrowski, Herbert, to U.S. Philips Corporation. Logic circuit for grey-tone printer. 4,033,443, Cl. 197-1.00R.

Burdeska, Kurt; and Schwander, Hansrudolf, to Ciba-Geigy Corporation. Nitro acridone dyes. 4,033,965, Cl. 260-279.00R.

Burdette Company, The: *See—*
Kemper, David C., 4,033,657, Cl. 339-19.000.

Burgat, Georges; and Guillemaut, Bernard, to Thimmonier S.A. Apparatus for opening bags. 4,033,096, Cl. 53-386.000.

Burger, Friedhelm: *See—*
Junghanns, Paul; and Burger, Friedhelm, 4,033,564, Cl. 266-242.000.

Burnett, Jack W., III, to Southern Weaving Company. Accordian fold cable with flexible clips over the folds. 4,034,150, Cl. 174-69.000.

Burnham, Robert D.; and Scifres, Donald R., to Xerox Corporation. Method of making buried-heterostructure diode injection laser. 4,033,796, Cl. 148-175.000.

Buron, Rene Henri, to International Business Machines Corporation. Switching system for multichannel lines. 4,034,159, Cl. 179-15.0AT.

Burris Company: *See—*
Burris, Donald J., 4,033,046, Cl. 33-297.000.

Burris, Donald J., to Burris Company. Riflescope reticle. 4,033,046, Cl. 33-297.000.

Burroughs Corporation: *See—*
Beery, Jack, 4,033,444, Cl. 197-1.00R.
Denny, William Michael; Hagen, Russell Louis; and Leung, Steve Ka-Lai, 4,034,353, Cl. 364-200.000.
Kruklitis, Karlis, 4,034,342, Cl. 340-146.3AG.
LaVenture, Orville W., 4,034,232, Cl. 307-32.000.
Romania, Samuel Richard; and Sprenkle, George Joseph, 4,033,032, Cl. 29-764.000.
Sims, Dewey M., Jr., 4,034,177, Cl. 200-159.00R.

Burson, Bob O., to R. E. Phelon Company, Inc. Ignition system with hazardous-start inhibiting interlock. 4,033,311, Cl. 123-179.00K.

Busanovich, Charles John; and Moore, Robert Milton, to RCA Corporation. Method of forming and treating cadmium selenide photoconductive bodies. 4,034,127, Cl. 427-76.000.

Butler, David J. Fastener applicators. 4,033,499, Cl. 227-120.000.

Butler, John F.: *See—*
Hamburg, Emil G.; Cryderman, Robert L.; and Butler, John F., 4,033,789, Cl. 148-12.00F.

Butterweck, Hans-Jurgen; Claasen, Theodoor Antonius Carel Maria; Mecklenbrauker, Wolfgang Friedrich Georg; and Peek, Johannes Bernhard Heinrich, to U.S. Philips Corporation. Digital signal processing device with quantizer. 4,034,196, Cl. 235-156.000.

Buxton, Incorporated: *See—*
Fontana, Giampiero, 4,033,162, Cl. 70-456.00B.

Byk Gulden Lomberg Chemische Fabrik GmbH: *See—*
Klemm, Kurt; and Langenscheid, Erhard, 4,034,093, Cl. 424-251.000.
Schoetensack, Wolfgang; and Riedel, Richard, 4,034,111, Cl. 424-319.000.

Byland, Henry Lowell. Package wrapping method and apparatus. 4,033,089, Cl. 53-33.000.

C.A.V. Limited: *See—*
Nicolls, Wilfrid Edward Walter, 4,033,310, Cl. 123-139.0AP.

C & D. Distributors, Inc.: *See—*
Piontkowski, Carl, 4,033,390, Cl. 144-193.00D.

C.G.R.-Mev.: *See—*
Azam, Guy; and Boux, Rene, 4,034,222, Cl. 250-355.000.

C&O Railroad Company: *See—*
Oros, Richard G., 4,033,851, Cl. 204-302.000.

Cailloux, Paul, to Promecam Sisson-Lehmann. Sheet-plate positioning device for machine tools. 4,033,572, Cl. 269-320.000.

Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., to Tribotech. Flange mount. 4,033,641, Cl. 308-15.000.

California Institute of Technology: *See—*
Chern, Shy-Shiun; and Maserjian, Joseph, 4,033,286, Cl. 118-49.000.
Houseman, John; and Cerini, Donald J., 4,033,133, Cl. 60-606.000.

Callery, Patrick S.; Zenker, Nicolas; Wright, Jeremy; and Stone, Clement A., to Merck & Co., Inc. Antihypertensive agents. 4,034,100, Cl. 424-272.000.

Calligaro, Daniel: *See—*
Chesnut, W. Richard; and Calligaro, Daniel, 4,033,522, Cl. 242-75.400.

Calspan Corporation: *See—*
Weatherston, Roger C., 4,033,708, Cl. 418-9.000.

Cameron, John Stratton, to Jeffries Truck Parts & Equipment, Inc. Means for attenuating the jarring and vibration of a truck-tractor. 4,033,607, Cl. 280-711.000.

Campbell, Steven J.: *See—*
Fleming, Phillip F.; and Campbell, Steven J., 4,033,518, Cl. 241-47.000.

Canadian Business Machines Ltd.: *See—*
Williams, John, 4,033,157, Cl. 70-85.000.

Canadian Instrumentation and Research Limited: *See—*
Failes, Michael, 4,033,052, Cl. 35-19.00B.

Canadian Marine Drilling Ltd.: *See—*
Schaper, Manfred, 4,033,277, Cl. 114-230.000.

Canadian Patents and Development Limited: *See—*
Capes, Charles E.; Germain, Rene J.; McIlhinney, Allan E.; Puddington, Ira E.; and Sirianni, Aurelio F., 4,033,729, Cl. 44-1.00A.
Kentfield, John A. C., 4,033,120, Cl. 60-249.000.

Candor, James T. Liquid removing method and apparatus. 4,033,841, Cl. 204-180.00R.

Cann, Lyle L., to Chemetron Corporation. Continuous method for making rod-like solid carbon dioxide extrusions. 4,033,736, Cl. 62-10.000.

Canon Kabushiki Kaisha: *See—*
Akima, Hideaki, 4,034,274, Cl. 318-334.000.
Hirayama, Kazuhiro; Tsukada, Syusei; and Inoue, Takahiro, 4,033,687, Cl. 355-1.000.
Iwashita, Tomonori; and Kozuki, Susumu, 4,034,388, Cl. 354-173.000.
Mashimo, Yukio; Ito, Tadashi; Shinoda, Nobuhiko; Sakurada, Nobuaki; and Ito, Fumio, 4,034,383, Cl. 354-23.00D.
Ohtaki, Shohei; Kozuki, Susumu; and Nakamura, Zenzo, 4,034,387, Cl. 354-126.000.
Sakamaki, Hisashi; and Ohtani, Toshiyuki, 4,034,189, Cl. 219-216.000.
Sekiguchi, Takeshi, 4,033,674, Cl. 350-184.000.
Tsunekawa, Tokuichi; Nakamoto, Soichi; and Taguchi, Tetsuya, 4,034,384, Cl. 354-33.000.
Uno, Keiichi; and Inoue, Mutsuhiro, 4,033,685, Cl. 353-82.000.

Canonne, Paul, to Societe d'Apparetillage Electrique Saparfi. Device for protection against current overcharges. 4,034,322, Cl. 335-42.000.

Capes, Charles E.; Germain, Rene J.; McIlhinney, Allan E.; Puddington, Ira E.; and Sirianni, Aurelio F., to Canadian Patents and Development Limited. Method of separating inorganic material from coal. 4,033,729, Cl. 44-1.00A.

Capio, Cesar Deduyo: *See—*
Alexander, Frank Bernard, Jr.; Capio, Cesar Deduyo; Hauser, Victor Emerald, Jr.; Levinstein, Hyman Joseph; Mogab, Cyril Joseph; Sinha, Ashok Kumar; and Wagner, Richard Siegfried, 4,033,287, Cl. 118-49.10R.

Capuano, Terry D., to Veeder Industries, Inc. Clamping split lock nut. 4,033,394, Cl. 151-21.00C.

Cardiac Pacemakers, Inc.: *See—*
Amundson, David Charles, 4,033,355, Cl. 128-404.000.

Carlsen, W. John, to GTE Laboratories Incorporated. Holographic digital data processing system with sequential data storage and retrieval. 4,034,355, Cl. 340-173.0LM.

Carlson, Alvin R., to Bank of America National Trust & Savings Association. Machine for packaging rolls of coins. 4,033,090, Cl. 53-78.000.

Carlson, David H. J., to UOP Inc. Mercaptan conversion process. 4,033,860, Cl. 208-206.000.

Carlson, Jerome A.: *See—*
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,033,641, Cl. 308-15.000.

Carlson, Richard D.: *See—*
Duffy, James J.; Carlson, Richard D.; and Watson, James C., 4,034,141, Cl. 428-473.000.

Carlson, Ronald H., to FMC Corporation. Process for preparing chloroisocyanurate complex compounds. 4,033,959, Cl. 260-248.00C.

Carnaud Total Interplastic: *See—*
Flamand, Guy, 4,033,172, Cl. 73-37.000.

Carr, Richard Wallace, to Diamond Power Specialty Corporation. Clip for reflective insulation. 4,033,464, Cl. 214-10.50R.

Carrere, Ricardo Haro, to Fredrick M. Kerr. Method for recovering material from the centers of phonograph records. 4,034,033, Cl. 264-36.000.

Carrier Corporation: *See—*
Duffey, James R.; and Smith, Joseph W., 4,033,163, Cl. 72-121.000.

Case, Dan Frank, to Automation Industries, Inc. Dual trace display for ultrasonic testing apparatus. 4,033,177, Cl. 73-67.900.

Cash, Robert J.: *See—*
Holt, Fred E.; Cash, Robert J.; and Schenter, Robert E., 4,033,813, Cl. 176-19.0LD.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 4,034,209, Cl. 235-61.90R.
Kashio, Toshio, 4,034,301, Cl. 328-37.000.
Kashio, Toshio, 4,034,350, Cl. 364-900.000.

Cassano, James R.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,033,574, Cl. 271-3.000.
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,033,579, Cl. 271-195.000.

Cassar, Luigi; Foa, Marco; and Gardano, Andrea, to Montedison Fibre S.p.A. Process for the preparation of carboxylic acids from organic halides. 4,034,004, Cl. 260-515.00R.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Bauer, Wolfgang; Krusche, Erwin; and Ribka, Joachim, 4,033,945, Cl. 260-157.000.

Castenson, Richard L.; Hazen, James R.; and Tien, Rex Y., to American Hoechst Corporation. Process for the preparation of 4-bromo-1,8-naphthalic acid anhydride. 4,033,986, Cl. 260-345.200.

Castillo, Adolfo: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; and Castillo, Adolfo, 4,033,025, Cl. 29-417.000.

Catalyst Research Corporation: *See—*
Sweet, Roger G., 4,034,143, Cl. 429-112.000.

Catanese, Carmen Anthony; Endriz, John Guiry; and Rajchman, Jan Aleksander, to RCA Corporation. Vane structure for a flat image display device. 4,034,255, Cl. 313-400.000.

Caterpillar Tractor Co.: *See—*
Balzer, David John, 4,033,631, Cl. 303-50.000.
Berg, Lawrance F., 4,033,235, Cl. 91-396.000.
Chamberlain, Richard W.; and Moore, Michael E., 4,033,158, Cl. 70-202.000.
Goloff, Alexander; and Brubaker, Hiram A., 4,033,231, Cl. 90-24.300.
Johnson, Howard L.; and Junck, John A., 4,033,236, Cl. 91-463.000.
Nichting, Robert P., 4,033,439, Cl. 192-85.0AA.

Cattaneo, Maurizio: *See—*
Bertone, Antonino; Rivetti, Enrico; and Cattaneo, Maurizio, 4,033,638, Cl. 303-116.000.

Cavitron Corporation: *See—*
Hardway, Edward V., Jr.; and Holtman, William H., 4,033,332, Cl. 128-2.00S.

Celanese Corporation: *See—*
Mims, Herman D.; Willes, John A.; and Gibson, Baylor D., 4,033,520, Cl. 242-43.00R.

Central Glass Co., Ltd.: *See—*
Aramaki, Minoru; and Ushirogouchi, Etsuo, 4,034,068, Cl. 423-465.000.

Centre Europeen de Recherches Mauvernay C.E.R.M.: *See—*
Pourrat, Henri; and Pourat nee Gaillard, Aimee, 4,033,818, Cl. 195-7.000.

Centre Technique Industriel dit: Institut Textile de France: *See—*
Vanhelle, Michel E., 4,033,102, Cl. 57-12.000.

Cepuritis, Talivaldis, to Johnson & Johnson. Disposable diaper having a tab fastener with a bifurcated fixed end. 4,033,348, Cl. 128-287.000.

Cerini, Donald J.: *See—*
Houseman, John; and Cerini, Donald J., 4,033,133, Cl. 60-606.000.

Cervin, Gunnar, to Cervinter AB. Work-facilitating apparatus for lining converters, metallurgical furnaces, holding vessels and like equipment. 4,033,463, Cl. 214-1.00H.

Cervinter AB: *See—*
Cervin, Gunnar, 4,033,463, Cl. 214-1.00H.

Chaky, Michael J.: *See—*
Thomas, David E.; McCoy, Marion B.; and Chaky, Michael J., 4,034,194, Cl. 235-153.0AC.

Chalmers, Alexander Michael: *See—*
Randell, Donald Richard; Cook, Barry; and Chalmers, Alexander Michael, 4,033,928, Cl. 260-45.80N.

Chamberlain, Richard W.; and Moore, Michael E., to Caterpillar Tractor Co. Adjustable steering wheel and transmission lock arrangement. 4,033,158, Cl. 70-202.000.

Chamberlin, Edward B. Portable atomizer apparatus. 4,033,511, Cl. 239-346.000.

Chang, Wen-Hsuan; Erikson, J. Alden; and Scriven, Roger L., to PPG Industries, Inc. Composition useful in making extensible films. 4,034,017, Cl. 260-859.00R.

Chapman, Earle F.; and Ruskin, Bernard J. Multiple position lamp. 4,034,214, Cl. 240-70.000.

Chariatte, Edgar: *See—*
Grossen, Walter; Gagnaux, Andre; and Chariatte, Edgar, 4,034,229, Cl. 250-541.000.

Charland, Terrence D.; and Klett, Stanley D., to Xerox Corporation. Developer mixing and transporting auger for magnetic brush developing apparatus. 4,033,294, Cl. 118-658.000.

Charles, Gilbert: *See—*
Balanca, Charles; and Charles, Gilbert, 4,034,362, Cl. 340-347.0AD.

Chas. S. Lewis & Co., Inc.: *See—*
Johnson, Thomas E., 4,033,767, Cl. 75-170.000.

Charlton, David, deceased: *See—*
Venus, James; Charlton, David, deceased; and Charlton, Martha, administratrix, 4,033,470, Cl. 214-152.000.

Charlton, Martha, administratrix: *See—*
Venus, James; Charlton, David, deceased; and Charlton, Martha, administratrix, 4,033,470, Cl. 214-152.000.

Chazen, Julius L.; and Brock, James Donald. Method and apparatus for cleaning shredded scrap. 4,033,458, Cl. 209-11.000.

Chemetron Corporation: *See—*
Cann, Lyle L., 4,033,736, Cl. 62-10.000.

Chemie Linz Aktiengesellschaft: *See—*
Zolss, Gerhard; Pittner, Heribert; and Stormann-Menninger-Lerchenthal, Heimo, 4,034,009, Cl. 260-553.00A.

Chern, Shy-Shiun; and Maserjian, Joseph, to California Institute of Technology. Chemical vapor deposition reactor. 4,033,286, Cl. 118-49.000.

Chesnut, W. Richard; and Calligaro, Daniel, to W. R. Chesnut Engi-

neering, Inc. Machine for advancing strip material through a utilization apparatus. 4,033,522, Cl. 242-75.400.

Chester, Nelson Sherwood; Laughon, Thomas Cecil; and Sindelar, William Frank, to Black and Decker Manufacturing Company, The. Portable power angle tool and switch mechanism. 4,033,077, Cl. 51-170.00T.

Chevalier, Andre, to Institut Francais du Petrole, des Carburants et Lubrifiants. Armored flexible pipe equipped with a rigid coupling. 4,033,612, Cl. 285-149.000.

Chevron Research Company: *See—*
Jacobson, Robert L.; and Ormiston, Robert M., 4,033,898, Cl. 252-416.000.
Singer, Malcolm S., 4,034,105, Cl. 424-300.000.

Chiba Communications Industries, Inc.: *See—*
Kotezawa, Katsutaka; Onodera, Toshimi; Hayashi, Setsuo; and Shimanuki, Fujio, 4,034,295, Cl. 325-39.000.

Chiba, Kunji: *See—*
Sasayama, Chikanobu; Suzuki, Osamu; Shimizu, Takeshi; and Chiba, Kunji, 4,033,107, Cl. 57-81.000.

Chicago Pneumatic Tool Company: *See—*
Hetzler, Robert B.; and Pierson, Gerald L., 4,033,129, Cl. 60-486.000.

Chireau, Roland F., to Yardney Electric Corporation. Separator for secondary alkaline batteries. 4,034,144, Cl. 429-144.000.

Chitose Corporation: *See—*
Hoshi, Sadao, 4,033,350, Cl. 128-303.130.

Cho, Susumu; Erickson, Paul Milton; and Reynolds, Gary Raymond, to Motorola, Inc. Audio signal quality indicator. 4,034,299, Cl. 325-363.000.

Christian, Joseph C.; and Steele, Arthur J., to Metrodata, Inc. Spark ignition gas flow control system. 4,033,711, Cl. 431-66.000.

Christink, Maurice O. Outboard motor service tank. 4,033,184, Cl. 73-117.100.

Christopoulos, John: *See—*
Mishcon, Lester; and Christopoulos, John, 4,033,150, Cl. 66-138.000.

Chrysler Corporation: *See—*
Hoetger, Robert Arthur; Hagaman, James Albert; and Nortman, William, 4,033,436, Cl. 192-3.300.
Smith, Robert H.; and Benford, Howard L., 4,033,605, Cl. 280-664.000.

Chu, Paul: *See—*
Flaum, Stephen S.; Connolly, Francis A.; and Chu, Paul, 4,033,217, Cl. 83-425.400.

Chuang, Vincent T.: *See—*
Omietanski, George M.; Furbee, Harold D.; and Chuang, Vincent T., 4,033,990, Cl. 260-448.20B.

Ciba-Geigy AG: *See—*
Beffa, Fabio; Back, Gerhard; and Steiner, Eginhard, 4,033,942, Cl. 260-145.00A.
Defago, Raymond; Ramanathan, Visvanathan; and Back, Gerhard, 4,033,716, Cl. 8-2.50A.

Ciba-Geigy Corporation: *See—*
Begrich, Rainer, 4,033,944, Cl. 260-153.000.
Burdeska, Kurt; and Schwander, Hansrudolf, 4,033,965, Cl. 260-279.00R.
Grieder, Alfred, 4,034,043, Cl. 260-578.000.
Habermeier, Jurgen, 4,034,018, Cl. 260-860.000.
Lind, Hanns; Rody, Jean; and Brunnetti, Heimo, 4,034,006, Cl. 260-521.00C.
Mattern, Gunter, 4,033,975, Cl. 260-296.00R.
Moser, Hans, 4,034,108, Cl. 424-309.000.
Ramanathan, Visvanathan; Della Casa, Angelo; de Montmollin, Rene; Hegar, Gert; and Schutz, Hans Ulrich, 4,033,943, Cl. 260-153.000.
Randell, Donald Richard; Cook, Barry; and Chalmers, Alexander Michael, 4,033,928, Cl. 260-45.80N.
Schwander, Hansrudolf, 4,033,973, Cl. 260-295.00F.

Ciga-Geigy Corporation: *See—*
Habermeier, Jurgen, 4,034,019, Cl. 260-860.000.

Cincinnati Milacron, Inc.: *See—*
Baker, Cyril Walter, 4,033,252, Cl. 100-99.000.
Suer, James David, 4,034,415, Cl. 361-24.000.

Cirino, John F. Release assembly for ski binding. 4,033,604, Cl. 280-628.000.

Claasen, Theodoor Antonius Carel Maria: *See—*
Butterweck, Hans-Jurgen; Claasen, Theodoor Antonius Carel Maria; Mecklenbrauker, Wolfgang Friedrich Georg; and Peek, Johannes Bernhard Heinrich, 4,034,196, Cl. 235-156.000.

Clairol Incorporated: *See—*
Walter, Henry J.; and Kunz, Raymond W., 4,034,201, Cl. 219-222.000.

Clark, Douglas: *See—*
Bickerdike, Robert Lewis; Clark, Douglas; Eastabrook, John Norman; Hughes, Garyth; Mair, William Norman; Partridge, Peter George; and Ranson, Harry Christopher, 4,033,793, Cl. 148-32.000.

Clark, Franklin F.; Nikolic, Cvetko B.; and Queneau, Paul B., to Amax Inc. Separation of cobalt from nickel by ozonation in the presence of ammonium salts. 4,034,059, Cl. 423-144.000.

Clark, Robert M.; and Cronin, John C., to Gould Inc. Contamination control device. 4,034,147, Cl. 174-14.00R.

Claudius Peters AG: *See—*
Stamer, Walter, 4,033,549, Cl. 251-86.000.

Clayton, John Peter: *See—*
Bentley, Peter Hubert; and Clayton, John Peter, 4,033,979, Cl. 260-306.70C.

Clean Energy Corporation: *See—*
Cramer, Frank B., 4,033,113, Cl. 60-39.020.

Cline, Harvey E.: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 4,033,786, Cl. 148-1.500.

Clotfelter, Wayman N., to United States of America, National Aeronautics and Space Administration. Method for measuring biaxial stress in a body subjected to stress inducing loads. 4,033,182, Cl. 73-88.00R.

Cocjin, Diosdado L.; and Masongsong, Artemio M., to Cocjin, Diosdado L. Spilled oil retriever and anti-water pollution water craft. 4,033,876, Cl. 210-242.00S.

Cocuzza, Gioacchino; Torreggiani, Gianni; and Sfregola, Michele, to Societa' Italiana Resine S.I.R. S.p.A. Process for the purification of ethylene oxide. 4,033,617, Cl. 203-27.000.

Coder, Glen L. Double adhesive masking tape. 4,033,803, Cl. 156-71.000.

Coe, Thomas F. Phase-locked loop oscillator. 4,034,310, Cl. 331-11.000.

Cohen, Harvey K.: *See—*
Conn, Arnold; and Cohen, Harvey K., 4,033,719, Cl. 21-102.00R.

Cohen, Marvin P.; Shavel, John, Jr.; and von Strandtmann, Max, to Warner-Lambert Company. [2-(4-Oxo-4H-1-benzopyran-2-yl)ethenyl]benzonitriles and benzoic acids. 4,033,845, Cl. 260-240.00D.

Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., to Ford Motor Company. Continuous stream treatment of ductile iron. 4,033,766, Cl. 75-123.0CB.

Colegate, Terence Dudley; Farnworth, Christopher Robert; and Davis, Eric Joseph, to Laporte Industries Limited. Recovery of metals. 4,033,764, Cl. 423-24.000.

Coleman, Lester Earl, to Lubrizol Corporation, The. Water-soluble hydroxyalkylated and alkoxyalkylated compositions derived from N-3-oxo-hydrocarbon-substituted acrylamides. 4,033,921, Cl. 260-29.60H.

Colgate-Palmolive Company: *See—*
Warren, William C.; Volpe, Anthony R.; and Rustogi, Kedar N., 4,033,008, Cl. 15-167.00R.

Collin, Per Harald, to ASEA Aktiebolag. Furnace for melting soiid ferrous pieces. 4,033,562, Cl. 266-216.000.

Colorflo Limited: *See—*
Farrow, Harold F., 4,033,258, Cl. 101-158.000.

Colt Industries Operating Corporation: *See—*
Miller, Robert J., 4,034,026, Cl. 261-23.00A.

Colvert, James H.; Jahnke, Frederick C.; and Williams, Dale, to Texaco Inc. Fluidized catalytic cracking process with improved intermediate cycle gas oil stripping. 4,033,856, Cl. 208-102.000.

Colvert, James H.: *See—*
Williams, Dale; Colvert, James H.; and Jahnke, Frederick C., 4,033,857, Cl. 208-102.000.

Combined Scientific Resources Corporation: *See—*
DeSalvo, Ernest J.; and Zarlengo, Marco D., 4,033,333, Cl. 128-2.06E.

Combustion Engineering, Inc.: *See—*
Sullivan, Robert Patton, 4,033,298, Cl. 122-510.000.

Commissariat a l'Energie Atomique: *See—*
Balanca, Charles; and Charles, Gilbert, 4,034,362, Cl. 340-347.0AD.
Bregeon, Louis; Dupuy, Gerard; Lerouge, Bernard; and Schwartz, Jean-Pierre, 4,033,814, Cl. 176-63.000.
le Gressus, Claude; Massignon, Daniel; and Sopizet, Rene, 4,034,220, Cl. 250-310.000.

Compaan, Klaas; and Bouwhuis, Gijsbertus, to U.S. Philips Corporation. Apparatus for positional control of a reading head in a device for reproducing optically coded video disk recordings. 4,034,403, Cl. 358-128.000.

Compagnie Honeywell Bull (Societe Anonyme): *See—*
Hostein, Claude, 4,034,346, Cl. 364-900.000.

Comtelco (U.K.) Limited: *See—*
Hill, John; and Turczanski, Henryk, 4,034,326, Cl. 337-34.000.

Concast AG: *See—*
Fluckiger, Friedrich, 4,033,558, Cl. 266-50.000.
Schmid, Markus, 4,033,404, Cl. 164-260.000.

Conn, Arnold; and Cohen, Harvey K. Ultraviolet sterilizer. 4,033,719, Cl. 21-102.00R.

Conn, John L.; and Spector, George. Ocean tide and wave energy converter. 4,034,231, Cl. 290-53.000.

Connolly, Francis A.: *See—*
Flaum, Stephen S.; Connolly, Francis A.; and Chu, Paul, 4,033,217, Cl. 83-425.400.

Consupak, Inc.: *See—*
Farrell, John Jerome, 4,034,036, Cl. 264-89.000.

Continental Group, Inc., The: *See—*
Manuel, Ernesto H., 4,034,132, Cl. 428-36.000.

Continental Oil Company: *See—*
Fredd, John V.; and Hill, William G., 4,033,408, Cl. 166-75.00R.
Starks, Charles M., 4,033,983, Cl. 260-33.6UA.
Waters, Kenneth H., 4,033,278, Cl. 114-245.000.

Cook, Barry: *See—*
Randell, Donald Richard; Cook, Barry; and Chalmers, Alexander Michael, 4,033,928, Cl. 260-45.80N.

Cook, James A., Jr., to PPG Industries, Inc. Hydrogen peroxide stabilization with triamides of phosphorus. 4,034,064, Cl. 423-272.000.

Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Ja-

nice, to Glaxo Laboratories Limited. 3-Hydroxymethyl-7β-(2-alkoxy-or benzyloxyimino-2-arylacetamido)ceph-3-em-4-carboxylic acids and salts thereof. 4,033,950, Cl. 260-243.00C.

Cooley, Jerry A. Method and means for punching sheet members. 4,033,037, Cl. 30-363.000.

Cooper, Jerry D. Steam generator apparatus. 4,034,203, Cl. 219-272.000.

Coquard, Jean; Sedivy, Pierre; Ruaud, Michel; and Verrier, Jean, to Rhone-Poulenc Industries. Bioresorbable surgical articles. 4,032,993, Cl. 3-1.000.

Corinthios, Michael J. Chess game apparatus. 4,033,586, Cl. 273-131.00K.

Corning Glass Works: *See—*
Baumgartner, Charles E.; and Bihuniak, Peter P., 4,033,780, Cl. 106-69.000.
Grossman, David G., 4,033,775, Cl. 106-39.700.
Mjos, Shirley A.; and Piasio, Roger N., 4,034,072, Cl. 424-1.000.
Weetall, Howard H., 4,034,073, Cl. 424-1.000.
Winkler, Ernel R., 4,033,779, Cl. 106-62.000.

Cottingham, Michael H. Cover for padlock. 4,033,156, Cl. 70-56.000.

Coulson, James; and Nearn, Malcolm Richard, to Lever Brothers Company. Process for making toothpaste. 4,034,076, Cl. 424-49.000.

Couture, Paul A.: *See—*
Jentoft, Arthur P.; and Couture, Paul A., 4,033,246, Cl. 98-42.00R.

Cox, Diane M., to Raymond Lee Organization, Inc., The. Transparent tailgate for stationwagons and pickup trucks. 4,033,619, Cl. 296-21.000.

Cragoe, Edward J., Jr.; and Jones, James H., to Merck & Co., Inc. 8-Aza-9-oxo(and dioxo)-thia-11,12-secoprostaglandins. 4,033,996, Cl. 260-490.000.

Craigie, Samuel W., to M. L. Aviation Company Limited. Cartridge holders. 4,033,226, Cl. 89-1.50F.

Cram, Bryan L.: *See—*
Morris, Joseph W.; Cram, Bryan L.; and Marchese, Vincent P., 4,033,267, Cl. 102-70.00R.

Cramer, Frank B., to Clean Energy Corporation. Steam generation with coal. 4,033,113, Cl. 60-39.020.

Cramer, Jerry W.: *See—*
Paddock, Paul F.; and Cramer, Jerry W., 4,033,450, Cl. 198-648.000.

Creative Innovations: *See—*
Bennett, Bruce A., 4,033,159, Cl. 70-233.000.

Crompton & Knowles Corporation: *See—*
Wueger, Karl W., 4,033,384, Cl. 139-452.000.

Cronin, Donald L.; Farber, Bertrand F.; Gehm, Hartmut K.; and Goldin, Daniel S., to TRW Inc. Multiple high voltage output DC-to-DC power converter. 4,034,280, Cl. 363-25.000.

Cronin, John C.: *See—*
Clark, Robert M.; and Cronin, John C., 4,034,147, Cl. 174-14.00R.

Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., to Pfizer Inc. Xylene-diamines as antiviral agents. 4,034,040, Cl. 260-570.900.

Cross, Eason, Jr. Replacement hold-down clip for suspended-ceiling panels. 4,033,079, Cl. 52-99.000.

Crow, William D.; Ottersbach, Thomas V.; and Hildebrandt, Eugene F., to Emerson Electric Co. Centrifugal actuated electric motor switch structure. 4,034,173, Cl. 200-80.00R.

Crowley, George C., to Northern Electric Company. Electric blanket control circuit. 4,034,185, Cl. 219-212.000.

Cryderman, Robert L.: *See—*
Hamburg, Emil G.; Cryderman, Robert L.; and Butler, John F., 4,033,789, Cl. 148-12.00F.

CSELT - Centro Studi e Laboratori Telecomunicazioni SpA: *See—*
Sant'Agostino, Marcello, 4,034,340, Cl. 340-146.10R.

Cudmore, Patrick J. Aerodynamic hanging birdhouse. 4,033,296, Cl. 119-23.000.

Cullen, James W.: *See—*
Love, Robert D.; Cullen, James W.; and Kruppa, Robert W., 4,034,243, Cl. 307-304.000.

Culpepper & Associates, Inc.: *See—*
Culpepper, Bertram C., Jr.; and Wilson, Richard C., 4,033,802, Cl. 156-71.000.

Culpepper, Bertram C., Jr.; and Wilson, Richard C., to Culpepper & Associates, Inc. Siding panel backerboard and method of manufacturing same. 4,033,802, Cl. 156-71.000.

Cunningham, Allen B., to Exxon Production Research Company. Method of reducing monochromatic interference in continuous wave seismic prospecting. 4,034,333, Cl. 340-15.5TA.

Cunningham, Frank W. Gauge for measuring length of an opening. 4,033,043, Cl. 33-143.00R.

Curlow, Rolf Lennart, to AB Gustavsbergs Fabriker. Corner clamp. 4,033,570, Cl. 269-41.000.

Currie, William E.; Gunning, David W.; and Russell, John G., to Parker-Hannifin Corporation. Hand operated swager. 4,033,022, Cl. 29-237.000.

Curtis, M. David, to Hooker Chemicals & Plastics Corporation. Method of preparing arsenic trifluoride. 4,034,069, Cl. 423-489.000.

Curtis, Omer E., Jr.; Tuller, Harold W.; O'Neill, Charles T.; and Nussbaum, Ralph W., to Allied Chemical Corporation. Production of polyanhydride epoxide prepolymer compositions. 4,034,014, Cl. 260-837.00R.

Curtis, William Childs: *See—*
de Pierre, Richard; Forgays, Gilbert Jerome; Behling, Hans Heinrich; and Curtis, William Childs, 4,034,373, Cl. 343-7.700.

Cuthbert, Roy A.: *See—*
Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., 4,034,080, Cl. 424-84.000.

Czernik, Daniel E.; and Brady, John F., to Felt Products Mfg. Co. Bearing pad assembly. 4,033,005, Cl. 14-16.100.

Dahlstrom, Baesley I.: *See—*
Hill, James E.; Dahlstrom, Baesley I.; and Fisher, Robert D., 4,034,210, Cl. 235-61.12N.

Daihatsu Motor Co., Ltd.: *See—*
Morita, Eiichi; Toda, Akira; Kobayashi, Toru; and Fujii, Hiroshi, 4,033,206, Cl. 82-2.00B.

Daiwa Boseki Kabushiki Kaisha: *See—*
Sasayama, Chikanobu; Suzuki, Osamu; Shimizu, Takeshi; and Chiba, Kunji, 4,033,107, Cl. 57-81.000.

Dalley, James Edwin, to Bell Telephone Laboratories, Incorporated. Overlap PCM coder/decoder with reaction time compensation. 4,034,294, Cl. 325-38.00R.

Dalmasso, Claudio, to Ing. C. Olivetti & C., S.p.A. Ufficio Brevetti. Liquid crystal devices. 4,033,672, Cl. 350-160.0LC.

Danfoss A/S: *See—*
Nicolaisen, Holger; Andersen, Finn Schnoor; and Tandrup, Leif Borge, 4,034,327, Cl. 337-41.000.

Danon, Joseph Solomon, to Singer Company, The. Latch assembly for slam-shut valves. 4,033,374, Cl. 137-461.000.

Data Packaging Corporation: *See—*
Lyman, Geroge F., 4,033,058, Cl. 40-97.000.

Daum, Werner; Brandes, Wilhelm; and Frohberger, Paul-Ernst, to Bayer Aktiengesellschaft. Carbamic acid esters of gallic acid, their esters, and heavy metal salts. 4,034,104, Cl. 424-289.000.

Davidson, Donald Douglas; and Engesvik, Bjorn I., to Witco Chemical Corporation. Thermal treatment of used petroleum oils. 4,033,859, Cl. 208-179.000.

Davis, Eric Joseph: *See—*
Colegate, Terence Dudley; Farnworth, Christopher Robert; and Davis, Eric Joseph, 4,033,764, Cl. 423-24.000.

Davis, Robert Earl, to Ball Corporation. Plunger assembly for a glass forming machine. 4,033,744, Cl. 65-362.000.

Davis, Robert Wayne: *See—*
Ward, James C.; and Davis, Robert Wayne, 4,033,606, Cl. 280-682.000.

Davis-Smith Corporation: *See—*
Smith, Curtiss A., 4,034,412, Cl. 360-103.000.

Davis, Thomas Francis: *See—*
Lerner, Lewis Brian; and Davis, Thomas Francis, 4,033,835, Cl. 204-43.00S.

De La Taille, Olivier P.: *See—*
Thary, Christian; Bernard, Armand R.; Labadie, Jean Francois; and De La Taille, Olivier P., 4,033,623, Cl. 297-390.000.

Decker, Harry Joe: *See—*
Kurtz, Abraham Nathan; Thorsteinson, Erlind Magnus; and Decker, Harry Joe, 4,034,008, Cl. 260-533.00N.

Dee, Anthony Neiman. Winding machines. 4,033,521, Cl. 242-56.00A.

Deering Milliken Research Corporation: *See—*
Johnson, Harold L., 4,033,154, Cl. 68-205.00R.

Dees, Erwin: *See—*
Lang, Franz; and Dees, Erwin, 4,033,646, Cl. 308-218.000.

De Fabritis, Diana C. Article support/display device. 4,033,462, Cl. 211-94.000.

Defago, Raymond; Ramanathan, Visvanathan; and Back, Gerhard, to Ciba-Geigy AG. Transfer printing process for hydrophilic fibrous material. 4,033,716, Cl. 8-2.50A.

De Haes, Louis Maria; Vermeulen, Leon Louis; Gevers, Hugo Karel; and De Winter, Walter Frans, to AGFA-GEVAERT N.V. Production of adhesive transfers by diffusion transfer. 4,033,770, Cl. 96-28.000.

Deis, August, to U.S. Philips Corporation. Microprogrammable computer data transfer architecture. 4,034,345, Cl. 364-200.000.

Deister Concentrator Company Inc.: *See—*
Stone, Spencer A., 4,033,863, Cl. 209-159.000.

De Kok, Johannes Arnoldus: *See—*
Nijs, Marc; Vanassche, Frits; and De Kok, Johannes Arnoldus, 4,033,387, Cl. 140-105.000.

Della Casa, Angelo: *See—*
Ramanathan, Visvanathan; Della Casa, Angelo; de Montmollin, Rene; Hegar, Gert; and Schutz, Hans Ulrich, 4,033,943, Cl. 260-153.000.

Delta Scientific Corporation: *See—*
Kushner, Jack; and Zwirblis, Henry G., 4,033,482, Cl. 222-136.000.

De Lucia, Jerry S. Padlock protecting device. 4,033,155, Cl. 70-56.000.

Demarcq, Michel; and Sleziona, Joseph, to Produits Chimiques Ugine Kuhlmann. Phosphoric esters of polyfluorinated alcohols, and their preparation. 4,034,022, Cl. 260-955.000.

De Masters, James J., to Brookline Instrument Company, Inc. Weighing scale. 4,033,420, Cl. 177-126.000.

Demmers, Arie Adolf, to Bos Kalis Westminster Group N.V. Spud guide means in a dredging vessel. 4,033,056, Cl. 37-73.000.

de Montmollin, Rene: *See—*
Ramanathan, Visvanathan; Della Casa, Angelo; de Montmollin, Rene; Hegar, Gert; and Schutz, Hans Ulrich, 4,033,943, Cl. 260-153.000.

Dempf, Dominik; Fruhwirth, Otto; and Schmidhammer, Ludwig, to Wacker-Chemie GmbH. Stabilization of perchloroethylene. 4,034,051, Cl. 260-652.50R.
Demsky, Herbert M.; Mathisen, Einar S.; Schumann, Paul A., Jr.; and Tong, Alvin H., to International Business Machines Corporation. Apparatus for textile color analysis. 4,033,698, Cl. 356-173.000.
Denecky, Nick. Fishing jigs. 4,033,062, Cl. 43-15.000.
Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Gunjigake, Koreaki; Hasegawa, Masashi; Oizumi, Hiroshi; and Ogata, Yoshio, 4,033,790, Cl. 148-22.000.
Denny, William Michael; Hagen, Russell Louis; and Leung, Steve Ka-Lai, to Burroughs Corporation. Computer system performance indicator. 4,034,353, Cl. 364-200.000.
de Passoz, Guy A.: *See—*
Aveneau, Andre A.; and de Passoz, Guy A., 4,034,236, Cl. 307-261.000.
de Pierre, Richard; Forgays, Gilbert Jerome; Behling, Hans Heinrich; and Curtis, William Childs, to RCA Corporation. Airborne moving-target indicating radar system. 4,034,373, Cl. 343-7.700.
Derchak, Nicholas: *See—*
Monaco, Robert F.; and Derchak, Nicholas, 4,034,349, Cl. 364-200.000.
DeRees, Delbert D., to American Motors Corporation. Vehicle air deflector. 4,033,245, Cl. 98-2.120.
Deres Development Corporation: *See—*
Lipfert, Donald Ernest, 4,033,567, Cl. 267-151.000.
De Roocker, Alain J. G., to Labofina S.A. Phosphoric acid ester based functional fluids. 4,033,887, Cl. 252-49.800.
De Rosa, Maria I. Cooling garment. 4,033,354, Cl. 128-379.000.
Derrick, H. William, Jr., to Derrick Manufacturing Corporation. Non-clogging screen apparatus. 4,033,865, Cl. 209-275.000.
Derrick Manufacturing Corporation: *See—*
Derrick, H. William, Jr., 4,033,865, Cl. 209-275.000.
DeSalvo, Ernest J.; and Zarlengo, Marco D., to Combined Scientific Resources Corporation. Electrode arrangement for taking electrocardiograms. 4,033,333, Cl. 128-2.06E.
Deslauriers, Clovis F. Rotary stripping wheel. 4,033,240, Cl. 93-36.00A.
Desmon, Leland Golde: *See—*
Lutes, Kenneth Vaughn; Desmon, Leland Golde; and Dodge, Edward Dana, 4,033,505, Cl. 236-15.0BD.
DeSoto, Inc.: *See—*
McLaughlin, Robert L.; and Wood, Donald C., 4,033,894, Cl. 252-99.000.
Sekmakas, Kazys; and Shah, Raj, 4,033,917, Cl. 260-29.20N.
Deutsch, Ralph, to Nippon Gakki Seizo Kabushiki Kaisha. Touch responsive control system for a keyboard electronic musical instrument. 4,033,219, Cl. 84-1.030.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Koberstein, Edgar; and Lakatos, Eduard, 4,034,060, Cl. 423-213.500.
Devine, Michael P.: *See—*
Brodman, Bruce W.; Devine, Michael P.; and Schwartz, Stuart, 4,033,798, Cl. 149-92.000.
De Winter, Walter Frans: *See—*
De Haes, Louis Maria; Vermeulen, Leon Louis; Gevers, Hugo Karel; and De Winter, Walter Frans, 4,033,770, Cl. 96-28.000.
Dhelft, Patrick, to SOFRESID, Societe Francaise d'Etude d'Installations Siderurgiques. Cooling plates for blast furnaces. 4,033,561, Cl. 266-193.000.
Diamond Power Specialty Corporation: *See—*
Carr, Richard Wallace, 4,033,464, Cl. 214-10.50R.
Heptner, Peter Josef, 4,033,383, Cl. 138-149.000.
Diamond Shamrock Corporation: *See—*
Baron, Joseph J., Jr.; and Krefting, Sherman, 4,033,922, Cl. 260-29.6RW.
Pohto, Gerald R.; and Olson, Richard O., 4,033,849, Cl. 204-286.000.
Strempel, Thomas G.; and Hora, Charles J., 4,033,848, Cl. 204-284.000.
Dichter, Michael: *See—*
Horowitz, Carl; and Dichter, Michael, 4,033,852, Cl. 208-8.000.
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Gahler, Egon; Heintke, Hans Eberhard; and Dietrich, Rolf, 4,034,278, Cl. 320-1.000.
Dietz, Wolfgang Friedrich Wilhelm, to RCA Corporation. Gate drive circuit for SCR deflection system. 4,034,262, Cl. 315-408.000.
Dietz, Wolfgang Friedrich Wilhelm, to RCA Corporation. Gate drive circuit for thyristor deflection system. 4,034,263, Cl. 315-408.000.
Diggs, Richard E. Aircraft parachute system. 4,033,528, Cl. 244-139.000.
Dill, Hans G.; and Toombs, Thomas N., to Hughes Aircraft Company. Method of manufacturing a complementary metal-insulation-semiconductor circuit. 4,033,797, Cl. 148-187.000.
Di Maio, Anthony E., to Marson Corporation. Multiple fluid dispenser. 4,033,480, Cl. 222-129.000.
DiMartini, Carl Richard; Scott, William Lafayette; and Bulvanoski, Leo James, to Asarco Incorporated. Process for the separation of copper sulfide from metallic lead entrained in a dross. 4,033,761, Cl. 75-77.000.
Dinkelbach, Anton, to Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H. Method and apparatus for controlling a tunneling machine. 4,033,626, Cl. 299-1.000.
DiSalino, Marco. Automatic coffee maker. 4,033,248, Cl. 99-281.000.
Dittberner, Ardie Reinhard: *See—*
Raabe, Rodney Dean; and Dittberner, Ardie Reinhard, 4,034,170, Cl. 200-50.00A.
Dlugos, Daniel F.: *See—*
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Dmitriev, Vasily Petrovich; Polyakov, Anatoly Mikhailovich; Tomilin, Alexandr Grigorievich; and Shushpan, Stanislav Mikhailovich. Fuel distribution arrangement. 4,033,116, Cl. 60-39.28R.
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Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,033,006, Cl. 14-75.000.
Dodge, Edward Dana: *See—*
Lutes, Kenneth Vaughn; Desmon, Leland Golde; and Dodge, Edward Dana, 4,033,505, Cl. 236-15.0BD.
Dodson, James C.: *See—*
Labyer, Harold S.; and Dodson, James C., 4,033,701, Cl. 403-13.000.
Dombrowski, Theodor, to Wilhelm Hegenscheidt GmbH. Support rolls for supporting wheels of a wheel set during reprofiling. 4,033,209, Cl. 82-8.000.
Donatelle, Leo P., to Spanjer Brothers, Inc. Table-saw guard. 4,033,218, Cl. 83-478.000.
Doornwaard, John: *See—*
Golya, William R.; and Doornwaard, John, 4,033,776, Cl. 106-46.000.
Doring, Lawrence C.; and Williams, Robert E., Jr., to Support Systems, Inc. Universal speaker stand. 4,033,653, Cl. 312-253.000.
Dotson, Ronald L.: *See—*
Kuo, Han C.; Dotson, Ronald L.; and Woodard, Kenneth E., Jr., 4,033,837, Cl. 204-98.000.
Dow Chemical Company, The: *See—*
Smith, Hubert Stacy, Jr., 4,034,027, Cl. 264-32.000.
Dow Corning Corporation: *See—*
Przybyla, Richard L., 4,034,140, Cl. 428-447.000.
Drake, Miles P.: *See—*
Sterling, Henley F.; and Drake, Miles P., 4,033,832, Cl. 204-15.000.
Dresser Industries, Inc.: *See—*
Louden, Lester Richard; Blessington, Clement Auguston; and Beatty, Jerry Lon, 4,034,219, Cl. 250-301.000.
Zinsmeyer, Herbert G.; Johnson, Rodney L.; Genz, Ralph H.; and Setliff, James E., 4,033,883, Cl. 250-231.0SE.
Drukier, Ira; and Mykietyn, Edward, to RCA Corporation. Interconnection means for an array of majority carrier microwave devices. 4,034,399, Cl. 357-68.000.
Drummond, Warren W., to PPG Industries, Inc. Method and apparatus for forming containerized glass strand package. 4,033,741, Cl. 65-2.000.
Dude, Henry Albert, to Eastman Kodak Company. Apparatus for coating sheet material. 4,033,290, Cl. 118-266.000.
Dufaylite Developments Limited: *See—*
Thwaites, Peter John; and Joyce, Peter Waterworth, 4,033,251, Cl. 100-95.000.
Duffey, James R.; and Smith, Joseph W., to Carrier Corporation. Apparatus for swaging tubular material. 4,033,163, Cl. 72-121.000.
Duffy, James J.; Carlson, Richard D.; and Watson, James C., to Hooker Chemicals & Plastics Corporation. Brominated phosphoramidates. 4,034,141, Cl. 428-473.000.
Dugle, Thomas E.; and Webb, Thomas L., to Klenco Corporation. Automatic overhead rail cleaner and oiler. 4,033,285, Cl. 118-4.000.
Dulin, Jacques M.: *See—*
Rosar, Edward C.; Dulin, Jacques M.; Genco, Joseph M.; and Rosenberg, Harvey S., 4,034,063, Cl. 423-244.000.
Dumont, Roger Louis. Optical device for lighting apparatus, with a plurality of combined reflectors. 4,034,217, Cl. 240-103.00R.
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Dunmore, Benjamin E.: *See—*
Meek, James M.; and Dunmore, Benjamin E., 4,034,273, Cl. 318-149.000.
Dunn, Garf L. Deformation-preventing workpiece-holding fixture for machine tools. 4,033,569, Cl. 269-26.000.
Dunn, Howard J.; and Farr, M. Paul, to Ralston Purina Company. Foods with microcrystalline chitin. 4,034,121, Cl. 426-565.000.
Du Pont de Nemours, E. I., and Company: *See—*
Foss, Robert Paul, 4,034,021, Cl. 260-887.000.
Hay, James Volney, 4,033,751, Cl. 71-92.000.
McIntosh, Colin Leslie, 4,033,749, Cl. 71-86.000.
Duprey, Richard H.: *See—*
Benoit, Roland A.; and Duprey, Richard H., 4,033,639, Cl. 308-3.600.
Dupuy, Gerard: *See—*
Bregeon, Louis; Dupuy, Gerard; Lerouge, Bernard; and Schwartz, Jean-Pierre, 4,033,814, Cl. 176-63.000.
Durant, Graham John; Ganellin, Charon Robin; and Owen, Geoffrey Robert, to Smith Kline & French Laboratories Limited. N-Oxy and N-amino guanidines. 4,034,101, Cl. 424-273.000.
Durkin, Joseph A.: *See—*
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DuRocher, Daniel J.: *See—*
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DuRocher, Gideon A.; and DuRocher, Daniel J., to Essex International, Inc. Electric motor protector. 4,034,265, Cl. 361-25.000.
Duwe, Edward Carl; and Duwe, William Edward. Apparatus for making interlocking crypt modules. 4,033,545, Cl. 249-98.000.
Duwe, William Edward: *See—*
Duwe, Edward Carl; and Duwe, William Edward, 4,033,545, Cl. 249-98.000.
Dybas, Richard A.: *See—*
Grier, Nathaniel; Dybas, Richard A.; and Strelitz, Robert A., 4,033,748, Cl. 71-67.000.
Dydyk, Michael, to Motorola, Inc. Microwave diode coaxial circuit oscillator improvement. 4,034,314, Cl. 331-101.000.
Dynamics Research Corporation: *See—*
Bakewell, Joseph J., 4,033,831, Cl. 204-11.000.
Dynapac Maskin AB: *See—*
Sturesson, Rune, 4,033,427, Cl. 180-140.000.
Dynetics Engineering Corporation: *See—*
Hill, James E.; Dahlstrom, Baesley I.; and Fisher, Robert D., 4,034,210, Cl. 235-61.12N.
E. R. Squibb & Sons, Inc.: *See—*
Hauck, Frederic Peter; and Sundeen, Joseph E., 4,033,971, Cl. 260-293.720.
Hill, John Anthony; Katz, Irwin A.; and Murphy, John H., 4,034,077, Cl. 424-69.000.
Hoehn, Hans; Bernstein, Jack; and Vogt, Berthold Richard, 4,033,970, Cl. 260-293.610.
Treuner, Uwe D., 4,033,958, Cl. 260-247.20B.
Vogt, B. Richard, 4,033,947, Cl. 260-239.30T.
E-Systems, Inc.: *See—*
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Earth Sciences, Inc.: *See—*
Loest, Kent W.; and Schaefer, John T., 4,033,842, Cl. 204-180.00P.
Eastabrook, John Norman: *See—*
Bickerdike, Robert Lewis; Clark, Douglas; Eastabrook, John Norman; Hughes, Garyth; Mair, William Norman; Partridge, Peter George; and Ranson, Harry Christopher, 4,033,793, Cl. 148-32.000.
Eastman Kodak Company: *See—*
Bethmann, Heinz G.; Kilguss, Heinz; and Simon, Horst, 4,034,391, Cl. 354-289.000.
Borton, Gary L.; Goff, Cobb S.; and Malloy, Richard J., 4,033,771, Cl. 96-60.0BF.
Dude, Henry Albert, 4,033,290, Cl. 118-266.000.
Roman, Robert Justin, 4,033,523, Cl. 242-198.000.
Easton, Harlan J. Grain drying and storage apparatus. 4,033,466, Cl. 214-17.0CB.
Easy Engineering Corporation: *See—*
Barcell, Ernest A.; and Pusch, James L., 4,033,515, Cl. 241-27.000.
Eaton Corporation: *See—*
Bedi, Ram D., 4,033,393, Cl. 151-14.500.
Gurwell, William E.; and Shaler, Amos J., 4,033,400, Cl. 164-98.000.
Johnson, Oliver Wendell, 4,033,377, Cl. 137-596.000.
Moran, Thomas M., 4,033,535, Cl. 248-56.000.
Walton, Erlen B., 4,033,301, Cl. 123-32.00G.
Walton, Erlen B., 4,033,314, Cl. 123-139.00R.
Wiltsey, Howard E., 4,033,438, Cl. 192-84.00A.
Ebejer, James G. Acoustic crossover speaker enclosure. 4,033,431, Cl. 181-152.000.
Eberius, Wiprecht; and Lorenz, Herbert, to Akzona Incorporated. Process for melt-spinning filaments from nozzles coated with stabilized silicone oil. 4,034,034, Cl. 264-39.000.
Eberle, Frederick L.; and Ostrofsky, Bernard, to Standard Oil Company (Indiana). Pocket-sized, direct-reading ultrasonic thickness gauge. 4,033,176, Cl. 73-67.900.
Eberle, William J., to General Battery Corporation. Automated post burn station. 4,033,402, Cl. 164-150.000.
Ebner, Ludwig: *See—*
Tybus, Gerd; Ebner, Ludwig; Waldhoer, Rudolf; Bichler, Peter; Bier, Wilhelm; Happe, Peter; and Weis, Frowald, 4,033,021, Cl. 29-157.00C.
Eckels, Robert E. Solar heat collector. 4,033,324, Cl. 126-270.000.
Edeleanu Gesellschaft mbH: *See—*
Putz, Joachim E., 4,033,855, Cl. 208-25.000.
Edison, Robert R.: *See—*
Holloway, Richard L.; Edison, Robert R.; and Wachtel, Stephen J., 4,033,861, Cl. 208-211.000.
Edward C. Levy Company: *See—*
Hauser, Karl V.; and Ronsaville, Edwin W., Jr., 4,033,781, Cl. 106-90.000.
Egli, Werner, to Armaturenfabrik Wallisellen AG. Mixing valve for controlling pressure and temperature of a liquid. 4,033,370, Cl. 137-100.000.
Ehlers, Bernd: *See—*
Bunge, Ernst; Rothgordt, Ulf; Ehlers, Bernd; and Piotrowski, Herbert, 4,033,443, Cl. 197-1.00R.
Ehlers, Brian C.; and Boulanger, Henry J., to Texas Instruments Incorporated. Switching module for solid-state keyboard. 4,034,234, Cl. 307-116.000.
Ehrhart, Wendell A. Tennis racket. 4,033,583, Cl. 273-73.00R.
Ehrmann, Karl: *See—*
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, 4,033,315, Cl. 123-146.50A.
Eichin, Harry P., to Union Carbide Corporation. Self-sustaining stick of shirred food casing. 4,033,382, Cl. 138-118.100.
Eisai Co., Ltd.: *See—*
Hamano, Sachiyuki; Kanazawa, Tamotsu; and Kitamura, Shin-ichi, 4,034,010, Cl. 260-564.00R.
Eiselt, Gunter; and Hossbach, Rudolf, to Eiselt, Gunter. Method of and device for cutting blocks of foamed material. 4,033,213, Cl. 83-56.000.
Eisenbraun, Ewald: *See—*
Briska, Marian; and Eisenbraun, Ewald, 4,034,130, Cl. 427-248.00C.
Eklund, John Folke; and Svensson, Sven-Hakan, to AB Bofors. Magazine specially intended for tank with large-calibre firearm. 4,033,227, Cl. 89-34.000.
Elecompack Company Limited: *See—*
Naito, Hanichiro; and Yamaguchi, Tsuneo, 4,033,649, Cl. 312-201.000.
Electricite de France (Service National): *See—*
Moreau, Andre, 4,033,297, Cl. 122-476.000.
Electro-Matic Staplers, Inc.: *See—*
Manganaro, George Frank, 4,033,500, Cl. 227-131.000.
Electro-Optiek, N.V.: *See—*
Sheldrake, Charles Peter Hedley; and Blake, Timothy Gunton, 4,034,398, Cl. 358-60.000.
Electroglas, Inc.: *See—*
Roch, Jacques Leon, 4,034,293, Cl. 324-158.00P.
Electronic Devices, Inc.: *See—*
Haddock, Don E., deceased, 4,034,337, Cl. 340-63.000.
Eli Lilly and Company: *See—*
Molloy, Bryan B., 4,034,011, Cl. 260-570.00R.
Stilz, John G.; and Jackson, Richard L., 4,033,941, Cl. 260-112.50R.
Elliott, James W.: *See—*
Murawski, Frank H.; Elliott, James W.; Richards, Fred W.; and Johns, Gordon L., 4,033,336, Cl. 128-2.05R.
Ellis, Gwynn Pennant: *See—*
Bays, David Edmund; Peel, Mervyn Evan; Waters, David Martin; and Ellis, Gwynn Pennant, 4,034,075, Cl. 424-45.000.
Emerson Electric Co.: *See—*
Crow, William D.; Ottersbach, Thomas V.; and Hildebrandt, Eugene F., 4,034,173, Cl. 200-80.00R.
EMI Limited: *See—*
Heavens, Michael; James, Richard Charles; and Slinn, Dennis Stanley, 4,034,224, Cl. 250-439.00P.
Emley, Edward Frederick: *See—*
Stowell, Michael James; Watts, Brian Michael; Emley, Edward Frederick; and Grimes, Roger, 4,033,794, Cl. 148-32.000.
Endo, Hiroshi: *See—*
Toriumi, Shiro; Endo, Hiroshi; Ueda, Nobuo; and Yamagishi, Seiichi, 4,033,684, Cl. 353-27.00A.
Endo, Toshiaki; and Hatta, Toshiro, to Nissan Motor Co., Ltd. Vehicle floor trimming fastening arrangement. 4,033,011, Cl. 24-73.0FT.
Endriz, John Guiry: *See—*
Catanese, Carmen Anthony; Endriz, John Guiry; and Rajchman, Jan Aleksander, 4,034,255, Cl. 313-400.000.
Energex Limited: *See—*
Lutes, Kenneth Vaughn; Desmon, Leland Golde; and Dodge, Edward Dana, 4,033,505, Cl. 236-15.0BD.
Engelhard Minerals & Chemicals Corporation: *See—*
Jameson, M. Phillip; and Huege, Fred R., 4,034,058, Cl. 423-118.000.
Engesland, Arne, to Lista Og Mosjoen Aluminiumverk, Elkem Aluminum A/S & Co. Apparatus for gas collection in aluminum smelting furnaces. 4,033,846, Cl. 204-247.000.
Engesvik, Bjorn I.: *See—*
Davidson, Donald Douglas; and Engesvik, Bjorn I., 4,033,859, Cl. 208-179.000.
Engineered Safety Products, Inc.: *See—*
Barr, Douglas, 4,033,276, Cl. 114-190.000.
England, Albert O., Jr. Desk mounting for telephone. 4,033,651, Cl. 312-237.000.
England, Robert W. Stand up toilet. 4,032,998, Cl. 4-111.000.
Engler, Dietrich: *See—*
Baron, Gerhard; Hafke, Carl; Engler, Dietrich; Reimert, Rainer; and Blaum, Eberhard, 4,033,730, Cl. 48-86.00R.
Engler, Theodore T. Digital segment display to braille converter. 4,033,053, Cl. 35-35.00A.
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Vandeweghe, Joseph L., 4,032,991, Cl. 2-173.000.
Enzell, Curt R.: *See—*
Almqvist, Sven-Olof; Enzell, Curt R.; Hjern, Lasse O.; Artho, Antoine; and Koch, Robert, 4,033,362, Cl. 131-264.000.
Enzmann, Sigmund Johann. Method for separating foreign solid particles from a liquid. 4,033,866, Cl. 210-42.00S.
Epsilon Lambda Electronics Corporation: *See—*
Knox, Robert M.; and Toulios, Peter P., 4,034,377, Cl. 343-180.000.
Erickson, Paul Milton: *See—*
Cho, Susumu; Erickson, Paul Milton; and Reynolds, Gary Raymond, 4,034,299, Cl. 325-363.000.
Erickson, Raymond C.; and Bambury, Ronald E., to Richardson-Mer-

rell Inc. 7[α-Amino-ω-(2,3-methylenedioxy-phenyl)acylamido]-cephalosporanic acid derivatives. 4,033,956, Cl. 260-243.00C.

Ericson, Eric A.; and Kaufhold, Frederick D., to General Electric Company. High current electrical joint apparatus. 4,033,660, Cl. 339-75.00M.

Erikson, J. Alden: *See—*
Chang, Wen-Hsuan; Erikson, J. Alden; and Scriven, Roger L., 4,034,017, Cl. 260-859.00R.

Ernest Scragg & Sons Limited: *See—*
McNeight, David Leslie; and Morris, William John, 4,033,105, Cl. 57-77.400.

Eshima, Masanori: *See—*
Nakashima, Akinobu; and Eshima, Masanori, 4,034,246, Cl. 310-81.000.

Essex Group, Inc.: *See—*
Taube, Donald R., 4,033,385, Cl. 140-92.100.

Essex International, Inc.: *See—*
DuRocher, Gideon A.; and DuRocher, Daniel J., 4,034,265, Cl. 361-25.000.

Estes, John H.: *See—*
Buinicky, Ernest P.; Durkin, Joseph A.; and Estes, John H., 4,033,901, Cl. 252-432.000.

Etablissement Public dit: Agence Nationale de Valorisation: *See—*
Vanhelle, Michel E., 4,033,102, Cl. 57-12.000.

Etablissements Bertrand Faure: *See—*
Thary, Christian; Bernard, Armand R.; Labadie, Jean Francois; and De La Taille, Olivier P., 4,033,623, Cl. 297-390.000.

Etablissements Poutrait-Morin: *See—*
Bouder, Paul C., 4,033,199, Cl. 74-594.600.

Ethyl Corporation: *See—*
Johnston, James D.; Sanders, Robert N.; and Wood, James M., Jr., 4,033,758, Cl. 75-67.00R.
Johnston, James D.; Sanders, Robert N.; and Wood, James M., Jr., 4,033,759, Cl. 75-67.00R.

Evans, Dafydd W., to Towmotor Corporation. Article hold-down device. 4,033,424, Cl. 180-68.500.

Evans, Frederick P.: *See—*
Taylor, Herbert E.; and Evans, Frederick P., 4,033,289, Cl. 118-227.000.

Evans, John H., to Stant Manufacturing Company, Inc. Roll-over gas cap. 4,033,475, Cl. 220-202.000.

Evans, William F.: *See—*
Merola, Carl R.; Evans, William F.; and Shaffer, Raymond E., 4,033,738, Cl. 62-158.000.

Evrard, Gerard Maurice Gaspard, to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation. Vibration absorber. 4,033,533, Cl. 248-358.00R.

Exxon Production Research Company: *See—*
Cunningham, Allen B., 4,034,333, Cl. 340-15.5TA.
Garcia, Juan A., 4,033,640, Cl. 308-4.00A.

F.J. Burrus & Cie: *See—*
Almqvist, Sven-Olof; Enzell, Curt R.; Hjern, Lasse O.; Artho, Antoine; and Koch, Robert, 4,033,362, Cl. 131-264.000.

F. L. Smidth & Co.: *See—*
Trelby, Ib Verner, 4,033,376, Cl. 137-580.000.

F & W Company, Inc.: *See—*
Frank, Eldon M., 4,033,469, Cl. 214-131.00A.

Fabrica Espanola Magnetos, S.A.: *See—*
Montoya, Jose Maria Tarrafeta, 4,033,635, Cl. 303-109.000.

Fabricius-Hansen, Rolf Leonard: *See—*
Ahlen, Karl Gustav; and Fabricius-Hansen, Rolf Leonard, 4,033,202, Cl. 74-866.000.

Failes, Michael, to Canadian Instrumentation and Research Limited; and Film Opticals of Canada Limited. Optical teaching aid. 4,033,052, Cl. 35-19.00B.

Failli, Amedeo: *See—*
Ferland, Jean-Marie; Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred K., 4,033,974, Cl. 260-295.50R.

Fair, Richard Barton; Hayes, John Saylor; and Rosser, William Morgan, to Bell Telephone Laboratories, Incorporated. Dividing metal plated semiconductor wafers. 4,033,027, Cl. 29-583.000.

Falk, Roland: *See—*
Woellhaf, Josef; Balz, Werner; Falk, Roland; Scheffel, Dieter; Richter, Volker; and Willmann, Paul, 4,033,288, Cl. 118-52.000.

Falvey, Henry T.: *See—*
Wadge, James C.; Falvey, Henry T.; and Johnson, Perry L., 4,033,704, Cl. 415-80.000.

Farber, Bertrand F.: *See—*
Cronin, Donald L.; Farber, Bertrand F.; Gehm, Hartmut K.; and Goidin, Daniel S., 4,034,280, Cl. 363-25.000.

Farge, Daniel: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,034,088, Cl. 424-246.000.
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,034,090, Cl. 424-246.000.

Farnworth, Christopher Robert: *See—*
Colegate, Terence Dudley; Farnworth, Christopher Robert; and Davis, Eric Joseph, 4,033,764, Cl. 423-24.000.

Farr, John B., to Standard Oil Company (Indiana). Downhole seismic source. 4,033,429, Cl. 181-106.000.

Farr, M. Paul: *See—*
Dunn, Howard J.; and Farr, M. Paul, 4,034,121, Cl. 426-565.000.

Farrell, John Jerome, to Consupak, Inc. Parison control in longitudinal stretch. 4,034,036, Cl. 264-89.000.

Farrell, Michael J.: *See—*
Willis, Barry G.; Schade, Henry A., Jr.; and Farrell, Michael J., 4,033,330, Cl. 128-2.00G.

Farrow, Harold F., to Colorflo Limited. Printing apparatus. 4,033,258, Cl. 101-158.000.

Faubl, Hermann: *See—*
Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., 4,034,040, Cl. 260-570.900.

Fawn Engineering Co.: *See—*
Wirstlin, Arthur N.; and Albright, Henry J., 4,033,442, Cl. 194-17.000.

Federal Business Products, Inc.: *See—*
Neill, Jimmie; and Wise, Lester V., 4,033,807, Cl. 156-384.000.

Federal-Mogul Corporation: *See—*
Ladin, Eli M., 4,033,440, Cl. 192-98.000.

Felt Products Mfg. Co.: *See—*
Czernik, Daniel E.; and Brady, John F., 4,033,005, Cl. 14-16.100.
Moerk, John C., Jr., 4,033,702, Cl. 404-69.000.

Felton, George F., Jr., to Suntech, Inc. Recycleable metalworking liquid. 4,033,886, Cl. 252-34.700.

Fenn Manufacturing Company, The: *See—*
Verbickas, Robert C., 4,033,075, Cl. 51-80.00A.

Ferland, Jean-Marie; Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred K., to American Home Products Corporation. Pyridylmethyl esters of N-(phenoxyalkanoyl)peptide derivatives. 4,033,974, Cl. 260-295.50R.

Fernandez, Eloy; Simeth, Claus; and Herzan, Georg, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Device for driving the plate cylinder in rotary printing presses, particularly offset printing presses. 4,033,261, Cl. 101-248.000.

Fernandez, John F. Bingo instrument. 4,033,589, Cl. 273-148.00R.

Fernicola, Robert C., to Union Carbide Corporation. Welding torch oscillator control system. 4,034,184, Cl. 219-124.000.

Ferrari, Patrick T., to Xerox Corporation. Copier document ejector. 4,033,694, Cl. 355-76.000.

Fiat Societa per Azioni: *See—*
Bertone, Antonino; Rivetti, Enrico; and Cattaneo, Maurizio, 4,033,638, Cl. 303-116.000.
Maioglio, Mauro; and Jacoel, Rafael, 4,033,305, Cl. 123-117.00D.
Palazzetti, Mario; and Grisotto, Franco, 4,034,271, Cl. 361-332.000.

Fikse, Tyman H. Adjustable-length semitrailer chassis and method of semitrailer maneuvering. 4,033,625, Cl. 298-22.00R.

Film Opticals of Canada Limited: *See—*
Failes, Michael, 4,033,052, Cl. 35-19.00B.

Firdaus, Asad, to International Business Machines Corporation. Method and system for sensing an identifying means. 4,033,173, Cl. 73-37.000.

Firester, Arthur Herbert, to RCA Corporation. System for recording redundant fourier-transform hologram. 4,033,665, Cl. 350-3.500.

Firmenich S.A.: *See—*
Sundt, Erling; and Ohloff, Gunther, 4,034,044, Cl. 260-586.00R.

Fischer & Porter Co.: *See—*
Herzl, Peter J., 4,033,188, Cl. 73-194.0VS.
Herzl, Peter J.; and Metzger, Harold W., 4,033,189, Cl. 73-194.0VS.

Fisher, Michael H.: *See—*
ten Broeke, Jan; Grabowski, Edward J. J.; Flataker, Lars M.; Fisher, Michael H.; and Patchett, Arthur A., 4,033,968, Cl. 260-288.0CF.

Fisher, Robert D.: *See—*
Hill, James E.; Dahlstrom, Baesley I.; and Fisher, Robert D., 4,034,210, Cl. 235-61.12N.

Fisk, James C. Strip stock lifter. 4,033,168, Cl. 72-420.000.

Flamand, Guy, to Carnaud Total Interplastic. Apparatus for testing hollow bodies. 4,033,172, Cl. 73-37.000.

Flamig, Hans: *See—*
Schiel, Christian; and Flamig, Hans, 4,033,049, Cl. 34-115.000.

Flataker, Lars M.: *See—*
ten Broeke, Jan; Grabowski, Edward J. J.; Flataker, Lars M.; Fisher, Michael H.; and Patchett, Arthur A., 4,033,968, Cl. 260-288.0CF.

Flattau, Theodore: *See—*
United States of America, National Aeronautics and Space Administration; Flattau, Theodore; Lange, Ronald Albert; Mellars, John Walter; Peyton, Bernard Joseph; and Wolczok, John Martin, 4,033,882, Cl. 250-199.000.

Flaum, Stephen S.; Connolly, Francis A.; and Chu, Paul, to S&S Corrugated Paper Machinery Co., Inc. Slitter having carrier for selective adjustment of a plurality of heads. 4,033,217, Cl. 83-425.400.

Fleck, Harry Ronald; and Mignosa, Charles Philip, to International Business Machines Corporation. Magnetic recording medium with lubricant. 4,034,133, Cl. 428-64.000.

Fleck, Horst G.: *See—*
Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A., 4,034,225, Cl. 250-471.000.

Fleming, James William, Jr., to Bell Telephone Laboratories, Incorporated. Multimode optical fiber. 4,033,667, Cl. 350-96.0WG.

Fleming, Phillip F.; and Campbell, Steven J., to Gehl Company. Forage harvester. 4,033,518, Cl. 241-47.000.

Fletcher, Keith Ernest: *See—*
Lorch, Edgar Adolf; Fletcher, Keith Ernest; and Page, David, 4,033,884, Cl. 250-496.000.

Fletcher, Kenneth S., III, to Foxboro Company, The. On-line amperometric analysis system and method incorporating automatic flow compensation. 4,033,830, Cl. 204-1.00T.

Flock Development and Research Company Limited: *See—*
McCalla, Charles, 4,033,010, Cl. 16-114.00R.

Fluckiger, Friedrich, to Concast AG. Apparatus for cutting a steel strand located in a supporting guide arrangement of a continuous casting installation. 4,033,558, Cl. 266-50.000.

FMC Corporation: *See—*
Carlson, Ronald H., 4,033,959, Cl. 260-248.00C.
Hardy, Donald, Sr.; and Orwoll, Edward Francis, 4,034,023, Cl. 260-973.000.
McRobert, Leon R., 4,033,100, Cl. 56-328.00R.
Mencacci, Samuel A., 4,033,093, Cl. 53-112.00B.
Wright, Carl Leonard; and Beacham, Harry Hoyt, 4,034,136, Cl. 428-246.000.

Foa, Marco: *See—*
Cassar, Luigi; Foa, Marco; and Gardano, Andrea, 4,034,004, Cl. 260-515.00R.

Fogarty, A. Edward: *See—*
Strongin, Ned; Fogarty, A. Edward; and Fogarty, Bonnie Rose, 4,033,070, Cl. 46-79.000.
Strongin, Ned; Fogarty, A. Edward; and Fogarty, Bonnie Rose, 4,033,071, Cl. 46-118.000.

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Strongin, Ned; Fogarty, A. Edward; and Fogarty, Bonnie Rose, 4,033,070, Cl. 46-79.000.
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Fong, Leong Q., to Motch & Merryweather Machinery Company, The. Fluidized bed for treating granular material. 4,033,555, Cl. 259-4.00R.

Fontana, Giampiero, to Buxton, Incorporated. Key case head. 4,033,162, Cl. 70-456.00B.

Food Technology Products: *See—*
Glabe, Elmer F., 4,034,117, Cl. 426-335.000.
Ziemke, William H.; and Glabe, Elmer F., 4,034,125, Cl. 426-650.000.

Ford Motor Company: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,033,766, Cl. 75-123.0CB.
Reneerkens, Josef, 4,033,644, Cl. 308-207.00A.
Stockton, Thomas R., 4,033,200, Cl. 74-740.000.
Tsoi-Hei Ma, Thomas, 4,034,028, Cl. 261-41.00R.
Wu, Hai; and Jones, Charles M., 4,033,303, Cl. 123-41.850.

Foreman, Donald S., to Honeywell Inc. Sine-to-square wave converter. 4,034,240, Cl. 307-252.00F.

Foreman, Gerald E.; and Worsley, Peter K., to Universal Oil Products Company. Spiral wound membrane module for direct osmosis separations. 4,033,878, Cl. 210-321.00A.

Foreman, Larry W. Amusement game. 4,033,585, Cl. 273-120.00R.

Forgays, Gilbert Jerome: *See—*
de Pierre, Richard; Forgays, Gilbert Jerome; Behling, Hans Heinrich; and Curtis, William Childs, 4,034,373, Cl. 343-7.700.

Forget, Leonel. Umbrella tent. 4,033,366, Cl. 135-2.000.

Foss, Robert Paul, to Du Pont de Nemours, E. I., and Company. Copolymers of pivalolactone and isoprene or butadiene. 4,034,021, Cl. 260-887.000.

Fourman, Robert G.: *See—*
Klepak, Philip B.; Richardson, David I.; and Fourman, Robert G., 4,033,365, Cl. 132-89.000.

Fowler, Gary K. Disposable cup holder. 4,033,489, Cl. 224-48.00C.

Fox, Richard: *See—*
Bolza, Frederick; Sadek, Lubos Vojtech; and Fox, Richard, 4,033,264, Cl. 102-24.00R.

Foxboro Company, The: *See—*
Fletcher, Kenneth S., III, 4,033,830, Cl. 204-1.00T.
Karas, Edwin L.; Annino, Raymond; and Kalinoski, Richard W., 4,033,171, Cl. 73-23.100.

Fr. Sauter AG., Fabrik elektr. Apparate: *See—*
Grossen, Walter; Gagnaux, Andre; and Chariatte, Edgar, 4,034,229, Cl. 250-541.000.

Francis, James Nelson: *See—*
Kasai, Paul Haruo; Francis, James Nelson; and Bishop, Roland Justin, Jr., 4,034,065, Cl. 423-328.000.

Frank, Eldon M., to F & W Company, Inc. Front end loader and method of mounting same on tractor. 4,033,469, Cl. 214-131.00A.

Fred M. Dellorfano, Jr. and Donald P. Massa, Trustees of The Stoneleigh Trust u/d/t: *See—*
Massa, Frank, 4,033,180, Cl. 73-71.5US.

Fred Whitaker Company: *See—*
Whitaker, Ralph, 4,033,717, Cl. 8-14.000.

Fredd, John V.; and Hill, William G., to Continental Oil Company. Go-devil storage and discharge assembly. 4,033,408, Cl. 166-75.00R.

Frederick, Leonard L. Pile driving hammer, apparatus and method. 4,033,139, Cl. 61-53.500.

Fredrick M. Kerr: *See—*
Carrere, Ricardo Haro, 4,034,033, Cl. 264-36.000.

Free, John Marshall; and Jeunelot, Charles William, to Hoffmann-La Roche Inc. System for coordination and documentation of material handling. 4,034,339, Cl. 340-146.10C.

Freed, Meier E.; and Potoski, John R., to American Home Products Corporation. 1,3-Bridged amino tetralins. 4,034,041, Cl. 260-571.000.

Freehauf, Eugene G.; Hollingsworth, Gene C.; and Welsh, David Edward, to Zero Manufacturing Company. Low profile integrated circuit socket. 4,033,656, Cl. 339-17.0CF.

Freeman, Daniel L.: *See—*
Friedel, William C., Jr.; Bettencourt, Thomas S.; and Freeman, Daniel L., 4,033,099, Cl. 56-327.00R.

Frentzen, Hermann Josef; Hendrix, Gerhard; Huppertz, Manfred; Ritter, Hans Georg; and Wittek, Fritz, to Mannesmann Aktiengesellschaft. Edge working machine with hold down for sheet metal to be worked. 4,033,568, Cl. 269-26.000.

Freund, Isaac, to Bar-Ilan University. Method of and means for producing radiation in the X-ray region. 4,034,226, Cl. 250-493.000.

Frey, Frederick E., to Rockwell International Corporation. Paper advancing mechanism. 4,033,560, Cl. 226-157.000.

Frey, Otto, to Sulzer Brothers Limited. Hip joint prosthesis. 4,032,994, Cl. 3-1.912.

Friedel, William C., Jr.; Bettencourt, Thomas S.; and Freeman, Daniel L., to University of California, The Regents of the. Tomato harvesting emp...ying electronic sorting. 4,033,099, Cl. 56-327.00R.

Fritz, David Paul; Anderson, John Dale; Pruitt, Martin Eugene; Mahagan, Deroy Ernest; and Buller, Richard James, to Hesston Corporation. Continuous load stack-forming method and machine. 4,033,101, Cl. 56-344.000.

Fritz, Thomas W.; Gilbo, Charles F.; and Johnson, Norman A., to Armstrong Cork Company. Back fastening of mobile home ceiling boards. 4,033,083, Cl. 52-484.000.

Frohberger, Paul-Ernst: *See—*
Daum, Werner; Brandes, Wilhelm; and Frohberger, Paul-Ernst, 4,034,104, Cl. 424-289.000.

Fromel, Gerhard; and Langenberger, Peter, to Robert Bosch GmbH. Fuel injection valve. 4,033,507, Cl. 239-102.000.

Frost, James D., Jr.: *See—*
United States of America, National Aeronautics and Space Administration; Frost, James D., Jr.; and Hillman, Carl E., Jr., 4,033,334, Cl. 128-2.10E.

Fruhwirth, Otto: *See—*
Dempf, Dominik; Fruhwirth, Otto; and Schmidhammer, Ludwig, 4,034,051, Cl. 260-652.50R.

Fuji Electric Company Ltd.: *See—*
Nagasawa, Ikuo; and Mukae, Kazuo, 4,033,906, Cl. 252-519.000.
Takezoe, Fumihiko, 4,034,351, Cl. 364-200.000.

Fuji Photo Film Co., Ltd.: *See—*
Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.

Fujii, Hiroshi: *See—*
Morita, Eiichi, Toda, Akira; Kobayashi, Toru; and Fujii, Hiroshi, 4,033,206, Cl. 82-2.00B.

Fujimoto, Sakae, to Ricoh Co., Ltd. Automatic sheet feed and delivery apparatus. 4,033,575, Cl. 271-3.000.

Fujimoto, Yoshinobu: *See—*
Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, 4,033,840, Cl. 204-159.170.

Fujishiro, Takeshi; and Sunano, Naomasa, to Nissan Motor Co., Ltd.; and Shinyei Kaisha. Hydrocarbon concentration sensor for use in engine exhaust gas. 4,033,169, Cl. 73-23.000.

Fujisou, Tokuo: *See—*
Ohmori, Tadashi; and Fujisou, Tokuo, 4,033,854, Cl. 208-14.000.

Fujita, Fumio: *See—*
Arimura, Toru; and Fujita, Fumio, 4,033,165, Cl. 72-205.000.

Fujitsu Ten Ltd.: *See—*
Tanigawa, Kou; Hashikawa, Kenzo; and Ota, Jun, 4,034,369, Cl. 340-52.00F.

Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, to Sony Corporation. Thermosetting acryloyloxy-terminate butadiene polymers. 4,033,840, Cl. 204-159.170.

Fukata, Yasuo: *See—*
Nakagome, Yukio; and Fukata, Yasuo, 4,034,404, Cl. 358-142.000.

Fukuda, Takeo; and Tashiro, Isao, to Tokyo Shibaura Electric Co., Ltd. Analog-digital converter. 4,034,364, Cl. 340-347.0NT.

Fukuoka, Tatsuo. Footwear. 4,033,054, Cl. 36-11.500.

Fukushima, Yoshikiyo, to Nippon Concrete Industries Co. Ltd. Concrete pole to be connected with a wood pole and method of replacing the lower part of the wood pole with the concrete pole. 4,033,080, Cl. 52-223.00R.

Funahashi, Takaji. Rotary date stamp. 4,033,257, Cl. 101-111.000.

Funakoshi, Yoshiro; Matsumura, Yoshihiko; Yamamoto, Masaki; and Komeda, Hiromu, to Takeda Chemical Industries, Ltd. Process for coating granular materials. 4,034,126, Cl. 427-8.000.

Furbee, Harold D.: *See—*
Omietanski, George M.; Furbee, Harold D.; and Chuang, Vincent T., 4,033,990, Cl. 260-448.20B.

Fusco, Anthony F. Foldable mudflap assembly. 4,033,599, Cl. 280-154.50R.

G. D. Societa per Azioni: *See—*
Seragnoli, Enzo, 4,033,198, Cl. 74-443.000.

Gabbert, James D.: *See—*
Hedrick, Ross M.; and Gabbert, James D., 4,034,015, Cl. 260-857.0FG.

GAF Corporation: *See—*
Sprung, Joseph A.; Panasik, Theodore; and Holmes, James J., 4,033,772, Cl. 96-114.000.

Gagnaux, Andre: *See—*
Grossen, Walter; Gagnaux, Andre; and Chariatte, Edgar, 4,034,229, Cl. 250-541.000.

Gahler, Egon; Heintke, Hans Eberhard; and Dietrich, Rolf, to Braun

Aktiengesellschaft. Charging circuit for a flash capacitor. 4,034,278, Cl. 320-1.000.
Galinke, Joachim: *See—*
Gruber, Werner; Galinke, Joachim; and Keil, Jurgen, 4,034,145, Cl. 526-328.000.
Ganellin, Charon Robin: *See—*
Durant, Graham John; Ganellin, Charon Robin; and Owen, Geoffrey Robert, 4,034,101, Cl. 424-273.000.
Garcia, Juan A., to Exxon Production Research Company. Seal bearing apparatus. 4,033,640, Cl. 308-4.00A.
Gard, Inc.: *See—*
Middleton, Charles G.; and Volpe, Vincent F., 4,033,494, Cl. 226-83.000.
Gardano, Andrea: *See—*
Cassar, Luigi; Foa, Marco; and Gardano, Andrea, 4,034,004, Cl. 260-515.00R.
Gardner, Delbert J., to Bendix Corporation, The. Two stage servomotor. 4,033,131, Cl. 60-553.000.
Gardner, John O.: *See—*
Untch, Karl G.; and Gardner, John O., 4,033,978, Cl. 260-306.70R.
Gastaud, Jean Marie. Derivatives of 17α-hydroxy, 19-norpregn-4-ene-3,20-dione. 4,033,988, Cl. 260-397.400.
Gavin, David F.: *See—*
Wojtowicz, John A.; and Gavin, David F., 4,034,070, Cl. 423-489.000.
Gebr. Eickhoff, Maschinenfabrik und Eisengiesserei m.b.H.: *See—*
Dinkelbach, Anton, 4,033,626, Cl. 299-1.000.
Gehl Company: *See—*
Fleming, Phillip F.; and Campbell, Steven J., 4,033,518, Cl. 241-47.000.
Gehm, Hartmut K.: *See—*
Cronin, Donald L.; Farber, Bertrand F.; Gehm, Hartmut K.; and Goldin, Daniel S., 4,034,280, Cl. 363-25.000.
Geist, James J. Articulated floating barrier. 4,033,137, Cl. 61-1.00F.
Genco, Joseph M.: *See—*
Rosar, Edward C.; Dulin, Jacques M.; Genco, Joseph M.; and Rosenberg, Harvey S., 4,034,063, Cl. 423-244.000.
General Battery Corporation: *See—*
Eberle, William J., 4,033,402, Cl. 164-150.000.
General Connectors Corporation: *See—*
Newman, Ray; and Affa, Steve, 4,033,381, Cl. 138-113.000.
General Dynamics Corporation: *See—*
Krikorian, Esther; and Sneed, Richard J., 4,033,843, Cl. 204-192.00P.
General Electric Company: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 4,033,786, Cl. 148-1.500.
Avery, Ralph W., 4,034,249, Cl. 310-253.000.
Borman, Willem F. H., 4,033,927, Cl. 260-45.70P.
Ericson, Eric A.; and Kaufhold, Frederick D., 4,033,660, Cl. 339-75.00M.
Giorgi, Robert A.; and Loyd, James E., III, 4,034,297, Cl. 325-166.000.
Hay, Allan S., 4,033,982, Cl. 260-327.00H.
Hoffman, Mary V., 4,034,257, Cl. 313-487.000.
Mark, Victor, 4,033,930, Cl. 260-45.90R.
McFadyen, Robert J.; and Peil, William, 4,034,298, Cl. 325-318.000.
McVey, Charles I., 4,034,252, Cl. 313-217.000.
Nutter, Norman E.; and Hoffman, Herbert N., 4,033,234, Cl. 91-384.000.
Raabe, Rodney Dean; and Dittberner, Ardie Reinhard, 4,034,170, Cl. 200-50.00A.
Scott, Garland E., Jr.; and Levenson, Michael K., 4,033,743, Cl. 65-30.00R.
Strong, Herbert M.; and Tuft, Roy E., 4,034,066, Cl. 423-446.000.
Wilkinson, Stanley B., 4,034,269, Cl. 361-79.000.
Zieroba, Richard T., 4,033,266, Cl. 102-70.20R.
General Foods Corporation: *See—*
Hamell, Matthew; Stefanucci, Arthur; and Ward, William W., 4,034,116, Cl. 426-131.000.
General Latex and Chemical Corporation: *See—*
Hopkins, Henry S., Jr.; and Vargo, Donald L., 4,033,908, Cl. 260-2.5AW.
General Refractories Company: *See—*
Brodmann, Franz J.; and Varker, Richard D., 4,033,783, Cl. 106-120.000.
General Signal Corporation: *See—*
Philibert, Robert A., 4,033,167, Cl. 72-367.000.
General Tire & Rubber Company, The: *See—*
Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, 4,033,900, Cl. 252-431.00L.
Genz, Ralph H.: *See—*
Zinsmeyer, Herbert G.; Johnson, Rodney L.; Genz, Ralph H.; and Setliff, James E., 4,033,883, Cl. 250-231.0SE.
Gerber Garment Technology, Inc.: *See—*
Pearl, David Raymond, 4,033,214, Cl. 83-174.000.
Gerlach, John N., to Kennecott Copper Corporation. Extractions of copper from solutions by reduction with anthraquinols. 4,033,765, Cl. 75-108.000.
Gerlach, Robert L.; and Rossini, George D., to Varian Associates, Inc. Interchangeable specimen trays and apparatus for a vacuum type testing system. 4,033,904, Cl. 250-491.000.
Germain, Rene J.: *See—*
Capes, Charles E.; Germain, Rene J.; McIlhinney, Allan E.; Puddington, Ira E.; and Sirianni, Aurelio F., 4,033,729, Cl. 44-1.00A.
Gershon Meckler Associates: *See—*
Meckler, Gershon, 4,033,740, Cl. 62-259.000.
Gerstein, Terry, to Revlon, Inc. Non-irritating shampoo compositions containing stearyl amine oxide. 4,033,895, Cl. 252-106.000.
Gertsch AG: *See—*
Horn, Hans, 4,033,603, Cl. 280-618.000.
Gesellschaft fur Kernforschung m.b.H.: *See—*
Tybus, Gerd; Ebner, Ludwig; Waldhoer, Rudolf; Bichler, Peter; Bier, Wilhelm; Happe, Peter; and Weis, Frowald, 4,033,021, Cl. 29-157.00C.
Gevers, Hugo Karel: *See—*
De Haes, Louis Maria; Vermeulen, Leon Louis; Gevers, Hugo Karel; and De Winter, Walter Frans, 4,033,770, Cl. 96-28.000.
Giaimo, Joseph. Combination drinking cup and storage container. 4,033,453, Cl. 206-217.000.
Giamei, Anthony F.; and Kear, Bernard H., to United Technologies Corporation. Composite single crystal article. 4,033,792, Cl. 148-32.000.
Gibbs, Charles D. Air wipe. 4,033,785, Cl. 134-15.000.
Gibson, Baylor D.: *See—*
Mims, Herman D.; Willes, John A.; and Gibson, Baylor D., 4,033,520, Cl. 242-43.00R.
Giglberger, Dieter: *See—*
Bestenreiner, Friedrich; and Giglberger, Dieter, 4,034,186, Cl. 219-216.000.
Gilbo, Charles F.: *See—*
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Gillern, M. Frank, to Weyerhaeuser Company. Acetone-formaldehyde-resorcinol resin compositions and adhesives prepared therefrom. 4,034,012, Cl. 260-828.000.
Gilmore, Guy T., to Multi-Fab, Inc. Facing tool. 4,033,208, Cl. 82-4.00C.
Gilpin, William Cecil; Heasman, Noel; and Williamson, John, to Steetley Limited. Process for making magnesia. 4,033,778, Cl. 106-58.000.
Giorgi, Robert A.; and Loyd, James E., III, to General Electric Company. Circuit for disabling a radio transmitter which is continuously operated longer than a predetermined time. 4,034,297, Cl. 325-166.000.
Girling Limited: *See—*
Bayliss, John Patrick, 4,033,435, Cl. 188-173.000.
Githens, Charles J.: *See—*
Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., 4,033,415, Cl. 166-308.000.
Givner, Morris Lincoln; and Schilling, Guenther, to American Home Products Corporation. Pregnancy test device. 4,033,723, Cl. 23-253.00R.
Glabe, Elmer F., to Food Technology Products. Process for preparing forage crop animal feeds. 4,034,117, Cl. 426-335.000.
Glabe, Elmer F.: *See—*
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Glaxo Laboratories Limited: *See—*
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 4,033,950, Cl. 260-243.00C.
Glickstein, Myer; and Tuomy, Justin M., to United States of America, Army. Compressed, freeze-dried cottage cheese and method of making. 4,034,123, Cl. 426-582.000.
Gloersen, Stig: *See—*
Gloersen, Stig Torleif, 4,033,811, Cl. 162-17.000.
Gloersen, Stig Torleif, to Gloersen, Stig. Method and apparatus for filling of fiber material and liquid to steam phase in treatment vessel. 4,033,811, Cl. 162-17.000.
Glover, Douglas Wade; Askman, Jan Philip; and Herrmann, Henry Otto, Jr., to AMP Incorporated. High voltage connector with crow bar. 4,034,172, Cl. 200-51.100.
Gloxhuber, Christian: *See—*
Ploger, Walter; Schmidt-Dunker, Manfred; and Gloxhuber, Christian, 4,034,086, Cl. 424-200.000.
Gneuss, Detlef: *See—*
Strutzel, Hans; Gneuss, Detlef; and Klenk, Ludwig, 4,034,055, Cl. 264-95.000.
Godard, Bernard; and Gomitoli, Roger, to La Cellophane. Sheet feeding devices. 4,033,577, Cl. 271-128.000.
Godtfring, Jack H.: *See—*
Klee, David J.; and Godtfring, Jack H., 4,033,140, Cl. 62-223.000.
Goebel, Hermann, to Bayer Aktiengesellschaft. Tetrakisazo dyestuffs. 4,033,946, Cl. 260-166.000.
Goes, Michael J. Fluid controlled security lock. 4,033,161, Cl. 70-275.000.
Goff, Cobb S.: *See—*
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Goins, John T. Method for stimulating the recovery of crude oil. 4,033,411, Cl. 166-257.000.
Gold, Nicholas, to Polaroid Corporation. Imbibition chamber adapter for self-developing camera. 4,034,386, Cl. 354-86.000.
Goldin, Daniel S.: *See—*
Cronin, Donald L.; Farber, Bertrand F.; Gehm, Hartmut K.; and Goldin, Daniel S., 4,034,280, Cl. 363-25.000.

Goldmacher, Howard K. Film registration device. 4,034,393, Cl. 354-354.000.
Goldman, Mark R.: *See—*
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Goloff, Alexander; and Brubaker, Hiram A., to Caterpillar Tractor Co. Apparatus for machining end housings. 4,033,231, Cl. 90-24.300.
Golya, William R.; and Doornwaard, John, to Saxonburg Ceramics, Inc. Composition of ceramic material. 4,033,776, Cl. 106-46.000.
Gomitoli, Roger: *See—*
Godard, Bernard; and Gomitoli, Roger, 4,033,577, Cl. 271-128.000.
Goodrich, George E.: *See—*
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,033,641, Cl. 308-15.000.
Goodyear Tire & Rubber Company, The: *See—*
Schoenberg, Emanuel, 4,034,000, Cl. 260-502.600.
Gore, William E.: *See—*
Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., 4,034,080, Cl. 424-84.000.
Goto, Eizo, to Tokyo Shibaura Electric Co., Ltd. Sheath heater. 4,034,330, Cl. 338-238.000.
Gottesman, Roy Tully, to Tenneco Chemicals, Inc. Process for the production of halogenated aromatic carboxylic acids. 4,034,007, Cl. 260-524.00R.
Gotz, Manfred K.: *See—*
Ferland, Jean-Marie; Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred K., 4,033,974, Cl. 260-295.50R.
Gould Inc.: *See—*
Clark, Robert M.; and Cronin, John C., 4,034,147, Cl. 174-14.00R.
Penrod, Glen H., 4,034,206, Cl. 219-464.000.
Grabowski, Edward J. J.: *See—*
ten Broeke, Jan; Grabowski, Edward J. J.; Flataker, Lars M.; Fisher, Michael H.; and Patchett, Arthur A., 4,033,968, Cl. 260-288.0CF.
Granatek, Alphonse Peter: *See—*
Kaplan, Murray Arthur; and Granatek, Alphonse Peter, 4,034,089, Cl. 424-246.000.
Granquist, William T., to NL Industries, Inc. Cracking hydrocarbons over laminar heavy metal aluminosilicates. 4,033,858, Cl. 208-115.000.
Gratzmuller, Jean Louis. Protracted-blast electric circuit-breaker for alternating currents. 4,034,175, Cl. 200-150.00R.
Graul, William E.: *See—*
Schorsch, John B.; Graul, William E.; and Barash, David, 4,033,142, Cl. 62-381.000.
Great Canadian Oil Sands Limited: *See—*
Hann, Thomas C. A., 4,033,853, Cl. 208-11.0LE.
Green, Garry J. Grass trimming apparatus. 4,033,098, Cl. 56-17.500.
Greenquist, Duane R., to Hoover Ball and Bearing Company. Side door bin with improved hinge support. 4,033,476, Cl. 220-334.000.
Gregor, Harry P. Pressure-driven enzyme-coupled membranes. 4,033,817, Cl. 195-2.000.
Gregor, Harry P. Enzyme-coupled ultrafiltration membranes. 4,033,822, Cl. 195-68.000.
Gregorian, Razmic S.; and Hoernle, Hans R., to United Merchants and Manufacturers, Inc. Laminates and coated substrates. 4,034,134, Cl. 428-86.000.
Gregory, Gordon Ian: *See—*
Cook, Martin Christopher; Gregory, Gordon Ian; and Bradshaw, Janice, 4,033,950, Cl. 260-243.00C.
Gregory, Ralph R.; and Benesh, Peter, to National Upper Cervical Chiropractic Research Association, Inc. Machine for determining vertebrae locations in the human body. 4,033,329, Cl. 128-2.00S.
Greif Bros. Corporation: *See—*
Santoni, Cesar, 4,033,454, Cl. 206-386.000.
Gretz, Charles: *See—*
Webster, Robert B.; and Gretz, Charles, 4,034,216, Cl. 240-78.00F.
Grieder, Alfred, to Ciba-Geigy Corporation. Alcoholic hydrolysis of 2-formylaminochlorotoluene. 4,034,043, Cl. 260-578.000.
Grier, Nathaniel; Dybas, Richard A.; and Strelitz, Robert A., to Merck & Co., Inc. Dibicyclo[3.1.1] and [2.2.1] heptyl and dibicyclo [3.1.1] and [2.2.1] heptenyl polyamines having a piperidine moiety. 4,033,748, Cl. 71-67.000.
Grimes, Roger: *See—*
Stowell, Michael James; Watts, Brian Michael; Emley, Edward Frederick; and Grimes, Roger, 4,033,794, Cl. 148-32.000.
Grisotto, Franco: *See—*
Palazzetti, Mario; and Grisotto, Franco, 4,034,271, Cl. 361-332.000.
Griswold, James L. Trench shoring assembly with stacking accessory. 4,033,138, Cl. 61-41.00A.
Gros, Eugene. Manufacture of articles of a substantially sack-like or tubular structure. 4,033,801, Cl. 156-70.000.
Gros, Georges: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,034,088, Cl. 424-246.000.
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,034,090, Cl. 424-246.000.
Gross, William G., to Armstrong Cork Company. Apparatus for applying adhesive to a furniture component. 4,033,284, Cl. 118-3.000.
Grosseau, Albert, to Societe Anonyme Automobiles Citroen. Hydraulic height-adjustment vehicle suspension. 4,033,423, Cl. 180-41.000.
Grossen, Walter; Gagnaux, Andre; and Chariatte, Edgar, to Fr. Sauter AG., Fabrik elektr. Apparate. Ozone generating apparatus. 4,034,229, Cl. 250-541.000.
Grossman, David G., to Corning Glass Works. Process for producing aluminous keatite ceramics. 4,033,775, Cl. 106-39.700.
Gruber, Werner; Galinke, Joachim; and Keil, Jurgen, to Henkel & Cie G.m.b.H. Anaerobically hardening adhesives and sealants containing an organic percarboxylic acids. 4,034,145, Cl. 526-328.000.
Grudzinskas, Charles Vincent; and Weiss, Martin Joseph. Novel compounds of the 11-deoxyprostaglandin E_2, R_2 , and F_2 series. 4,033,992, Cl. 260-456.00R.
Grundy, Reed H., to Westinghouse Air Brake Company. Most restrictive digital to analog converter. 4,034,365, Cl. 340-347.0DA.
Gsching, Irmgard, heiress: *See—*
Gsching, Wilhelm, deceased, 4,033,239, Cl. 92-58.000.
Gsching, Wilhelm, deceased (by Gsching, Irmgard, heiress), to Sulzer Brothers Limited. Radial piston machine. 4,033,239, Cl. 92-58.000.
GTE Automatic Electric Laboratories Incorporated: *See—*
Hrdlicka, Eugene R.; Vincolese, George J.; and Szuberla, John H., 4,034,157, Cl. 179-1.0PC.
GTE Laboratories Incorporated: *See—*
Carlsen, W. John, 4,034,355, Cl. 340-173.0LM.
Guegan, Yves. Shock absorber pad of molded fibers for the drop casting of ingots. 4,033,546, Cl. 249-174.000.
Guillemaut, Bernard: *See—*
Burgat, Georges; and Guillemaut, Bernard, 4,033,096, Cl. 53-386.000.
Gulf Research & Development Company: *See—*
Hoffmann, Otto L., 4,033,756, Cl. 71-118.000.
Gunjigake, Koreaki; Hasegawa, Masashi; Oizumi, Hiroshi; and Ogata, Yoshio, to Denki Kagaku Kogyo Kabushiki Kaisha. Solid diffusion dopants for semiconductors and method of making the same. 4,033,790, Cl. 148-22.000.
Gunning, David W.: *See—*
Currie, William E.; Gunning, David W.; and Russell, John G., 4,033,022, Cl. 29-237.000.
Gurwell, William E.; and Shaler, Amos J., to Eaton Corporation. Method of forming a composite by infiltrating a porous preform. 4,033,400, Cl. 164-98.000.
Guss, Stephen B.; Goldman, Mark R.; and Zir, Leonard M. Cardiac catheter and method of using same. 4,033,331, Cl. 128-2.00M.
Gustafsson, Berth Ulrik, to Projectus Industriprodukter AB. Method for thermal running of a heat pump plant and plant for carrying out the method. 4,033,141, Cl. 62-238.000.
Haake, Inc.: *See—*
Kromer, Heiner M.; and Ossman, John, 4,033,557, Cl. 259-192.000.
Haas, David J., to North American Philips Corporation. Transmission x-ray tube. 4,034,251, Cl. 313-59.000.
Habermeier, Jurgen, to Ciba-Geigy Corporation. Linear polyesters based on s-triazinedicarboxylic acids. 4,034,018, Cl. 260-860.000.
Habermeier, Jurgen, to Ciga-Geigy Corporation. Linear copolyesters based on terephthalic acid and/or isophthalic acid. 4,034,019, Cl. 260-860.000.
Hadary, Joseph. Toothbrush. 4,033,007, Cl. 15-172.000.
Haddad, Ihsan A.; and Arsenault, Alvin R., to Instrumentation Laboratory, Inc. Cell culture system. 4,033,825, Cl. 195-127.000.
Haddock, Don E., deceased (by Haddock, Joan L., administratrix), to Electronic Devices, Inc. Vehicle alarm apparatus. 4,034,337, Cl. 340-63.000.
Haddock, Joan L., administratrix: *See—*
Haddock, Don E., deceased, 4,034,337, Cl. 340-63.000.
Haeder, Gert Wilhelm, to Rank Organisation Limited, The. Transducer with rearwardly disposed damping elements. 4,034,165, Cl. 179-115.50R.
Hafke, Carl: *See—*
Baron, Gerhard; Hafke, Carl; Engler, Dietrich; Reimert, Rainer; and Blaum, Eberhard, 4,033,730, Cl. 48-86.00R.
Hagaman, James Albert: *See—*
Hoetger, Robert Arthur; Hagaman, James Albert; and Nortman, William, 4,033,436, Cl. 192-3.300.
Hagen, Russell Louis: *See—*
Denny, William Michael; Hagen, Russell Louis; and Leung, Steve Ka-Lai, 4,034,353, Cl. 364-200.000.
Hager & Elsaesser: *See—*
Marquardt, Kurt; and Buchholz, Reinhard, 4,033,874, Cl. 210-189.000.
Hahn, Joachim: *See—*
Kreuz, Alois; and Hahn, Joachim, 4,033,191, Cl. 73-431.000.
Haines, Norman William. Brick tie. 4,033,085, Cl. 52-698.000.
Hakuju Institute for Health Science Co., Ltd.: *See—*
Hara, Takaaki, 4,033,356, Cl. 128-405.000.
Hale, William J.: *See—*
Horst, William R.; and Hale, William J., 4,034,211, Cl. 235-61.12N.
Halliburton Company: *See—*
Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., 4,033,415, Cl. 166-308.000.
Labyer, Harold S.; and Dodson, James C., 4,033,701, Cl. 403-13.000.
Lawson, Michael B.; and Snyder, Kenneth J., 4,033,784, Cl. 134-20.000.
Hallock, David B., to Rockwell International Corporation. Method and apparatus for generating a non-linear signal. 4,034,304, Cl. 328-142.000.

Hamaguchi, Yoshi: *See—*
Tomioka, Tatsuyuki; Yukami, Noboru; Hamaguchi, Yoshi; and Yamashita, Kiyoharu, 4,034,187, Cl. 219-216.000.

Hamano, Sachiyuki; Kanazawa, Tamotsu; and Kitamura, Shin-ichi, to Eisai Co., Ltd. Bis-(meta-amidinophenoxy)-compounds and pharmacologically acceptable acid addition salts thereof. 4,034,010, Cl. 260-564.00R.

Hamblin, Richard David, to Archibald Kenrick and Sons Limited. Shelf supports. 4,033,540, Cl. 248-246.000.

Hamburg, Emil G.; Cryderman, Robert L.; and Butler, John F., to Jones & Laughlin Steel Corporation. Method of producing a high strength steel having uniform elongation. 4,033,789, Cl. 148-12.00F.

Hamell, Matthew; Stefanucci, Arthur; and Ward, William W., to General Foods Corporation. Packaged roasted coffee products. 4,034,116, Cl. 426-131.000.

Hamlet, Buck C.: *See—*
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 4,033,608, Cl. 280-711.000.

Hamlin, Thomas J.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,033,574, Cl. 271-3.000.
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,033,579, Cl. 271-195.000.

Hammann, Ingeborg: *See—*
Hoffmann, Hellmut; and Hammann, Ingeborg, 4,034,085, Cl. 424-200.000.

Hanaoka, Seiji, to Kabushiki Kaisha Suwa Seikosha. Printer. 4,033,256, Cl. 101-99.000.

Hancock, Allen W., II; and Vanderwerff, William D., to Sun Ventures, Inc. Process for making aromatic acids. 4,034,005, Cl. 260-515.00P.

Hann, Thomas C. A., to Great Canadian Oil Sands Limited. Process and apparatus for heating and deaerating raw bituminous froth. 4,033,853, Cl. 208-11.0LE.

Hanning, Robert. Apparatus for making thermoplastic articles with porous cores and less porous or nonporous skins. 4,033,710, Cl. 425-543.000.

Hansel, William B.; and Lindeman, Myrl A., to Suntech, Inc. Interlock and latching systems for a dispensing nozzle. 4,033,389, Cl. 141-207.000.

Hanson, Delon C., to Hewlett-Packard Company. Precision optical fiber switch. 4,033,669, Cl. 350-96.00C.

Hanson, Ronald P., to Ideal Industries, Inc. Conduit fitting. 4,033,614, Cl. 285-248.000.

Hanson, Theodore L.: *See—*
Hoppe, William C.; and Hanson, Theodore L., 4,033,477, Cl. 221-114.000.

Happe, Peter: *See—*
Tybus, Gerd; Ebner, Ludwig; Waldhoer, Rudolf; Bichler, Peter; Bier, Wilhelm; Happe, Peter; and Weis, Frowald, 4,033,021, Cl. 29-157.00C.

Hara, Takaaki, to Hakuju Institute for Health Science Co., Ltd. Apparatus for therapeutical treatment and stimulation of muscles by low-frequency oscillating electric current. 4,033,356, Cl. 128-405.000.

Harada, Saburo: *See—*
Watanabe, Akira; and Harada, Saburo, 4,033,017, Cl. 29-25.350.

Harazoe, Yoshiaki; Kurakami, Shigeru; Okamoto, Michio; and Hasegawa, Ichiro, to Kabushiki Kaisha Komatsu Seisakusho. Automatic safety and alarming apparatus for construction equipments. 4,034,335, Cl. 340-52.00F.

Hardway, Edward V., Jr.; and Holtman, William H., to Cavitron Corporation. Activity and respiration monitor. 4,033,332, Cl. 128-2.00S.

Hardy, Donald, Sr.; and Orwoll, Edward Francis, to FMC Corporation. Process for preparing mixed phosphate ester compositions. 4,034,023, Cl. 260-973.000.

Hargis, Ivan Glen; Livigni, Russell Anthony; and Aggarwal, Sundar Lal, to General Tire & Rubber Company, The. Composition useful in anionic polymerization. 4,033,900, Cl. 252-431.00L.

Harrington, Duane Earl. Integral cigarette paper holder element. 4,033,358, Cl. 131-15.00R.

Harris Corporation: *See—*
Richmond, Abraham W., 4,033,263, Cl. 101-416.00A.

Harris, Garrett H. Protective mounting for outboard motors. 4,033,530, Cl. 248-4.000.

Harris, Ian Richard: *See—*
Horsewell, Henry George; and Harris, Ian Richard, 4,033,361, Cl. 131-262.00A.

Harris, Nicholas D., to Morton-Norwich Products, Inc. Vinylbenzyl ester of an N-BOC amino acid. 4,033,998, Cl. 260-471.00C.

Harrison, Norman, to Lucas Electrical Company Limited. Method for plating. 4,033,834, Cl. 204-15.000.

Harry Ferguson Limited: *See—*
Rolt, Anthony P. R.; and Walker, Frederick J., 4,033,636, Cl. 303-114.000.

Hartemann, Pierre, to Thomson-CSF. System for measuring the frequency of an electrical signal. 4,034,288, Cl. 324-80.000.

Hartog, Jan; and Zwagemakers, Johannes Maria Antonius, to U.S. Philips Corporation. Aralkylamino sulfones having spasmolytic activities. 4,034,103, Cl. 424-282.000.

Harvey, Robin J.: *See—*
Lutz, Michael A.; and Harvey, Robin J., 4,034,261, Cl. 315-344.000.

Harvey, Walter W.; Randlett, Myron R.; and Bangerskis, Karlis I., to Kennecott Copper Corporation. Method for series electrowinning and electrorefining of metals. 4,033,839, Cl. 204-108.000.

Hase, Akira: *See—*
Aoki, Yutaka; Hase, Akira; and Ito, Jiro, 4,033,728, Cl. 44-1.00R.

Hasegawa, Ichiro: *See—*
Harazoe, Yoshiaki; Kurakami, Shigeru; Okamoto, Michio; and Hasegawa, Ichiro, 4,034,335, Cl. 340-52.00F.

Hasegawa, Katsuji, to Meinan Machinery Works, Inc. Method of and device for severing a veneer sheet. 4,033,212, Cl. 83-13.000.

Hasegawa, Masashi: *See—*
Gunjigake, Koreaki; Hasegawa, Masashi; Oizumi, Hiroshi; and Ogata, Yoshio, 4,033,790, Cl. 148-22.000.

Hashikawa, Kenzo: *See—*
Tanigawa, Kou; Hashikawa, Kenzo; and Ota, Jun, 4,034,369, Cl. 340-52.00F.

Hashimoto, Hideo. Decorative light display. 4,034,215, Cl. 240-10.00L.

Hashimoto, Shunichi; and Kirino, Osamu, to Sumitomo Chemical Company, Ltd. Pyridyltriazinone compounds. 4,033,752, Cl. 71-93.000.

Hatta, Toshiro: *See—*
Endo, Toshiaki; and Hatta, Toshiro, 4,033,011, Cl. 24-73.0FT.

Hauber, Rudiger, to Beiersdorf Aktiengesellschaft. Water removable pressure sensitive adhesive. 4,033,918, Cl. 260-29.6WB.

Hauck, Frederic Peter; and Sundeen, Joseph E., to E. R. Squibb & Sons, Inc. Cyclohexane tetrols and derivatives thereof. 4,033,971, Cl. 260-293.720.

Hauser, Karl V.; and Ronsaville, Edwin W., Jr., to Amtech, Inc.; and Edward C. Levy Company, part interest to each. Fiber reinforced structural material. 4,033,781, Cl. 106-90.000.

Hauser, Victor Emerald, Jr.: *See—*
Alexander, Frank Bernard, Jr.; Capio, Cesar Deduyo; Hauser, Victor Emerald, Jr.; Levinstein, Hyman Joseph; Mogab, Cyril Joseph; Sinha, Ashok Kumar; and Wagner, Richard Siegfried, 4,033,287, Cl. 118-49.10R.

Hay, Allan S., to General Electric Company. 3,4,5-Trithiapolycyclo compounds and derivatives. 4,033,982, Cl. 260-327.00H.

Hay, James Volney, to Du Pont de Nemours, E. I., and Company. 2-(Substituted-phenyl)-hexahydro- and tetrahydro-3-(2H)-cinnolinones as herbicides. 4,033,751, Cl. 71-92.000.

Hayami, Heijiro: *See—*
Tsuchiya, Hiroyoshi; Tsuda, Yukifumi; Hayami, Heijiro; and Kotera, Hiroaki, 4,034,406, Cl. 358-260.000.

Hayashi, Masaki; Kori, Seiji; Miyake, Hajimu; Yamato, Takashi; and Suga, Hisashi, to Ono Pharmaceutical Co., Ltd. 15-Cycloalkyl-prostaglandins. 4,034,003, Cl. 260-514.00D.

Hayashi, Setsuo: *See—*
Kotezawa, Katsutaka; Onodera, Toshimi; Hayashi, Setsuo; and Shimanuki, Fujio, 4,034,295, Cl. 325-39.000.

Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, to Nissan Motor Co., Ltd. Exhaust gas recirculation control system. 4,033,308, Cl. 123-119.00A.

Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Nagumo, Shin-ichi, to Nissan Motor Co., Ltd. Exhaust gas recirculation system with control apparatus for exhaust gas flow control valve. 4,033,309, Cl. 123-119.00A.

Hayes, John Saylor: *See—*
Fair, Richard Barton; Hayes, John Saylor; and Rosser, William Morgan, 4,033,027, Cl. 29-583.000.

Hayes, Terence James: *See—*
Mitrovic, Milan; and Hayes, Terence James, 4,034,110, Cl. 424-311.000.

Haynes, Richard: *See—*
Bestel, John Louis; Haynes, Richard; and Srinivasan, Venkataraman, 4,033,833, Cl. 204-15.000.

Hazen, James R.: *See—*
Castenson, Richard L.; Hazen, James R.; and Tien, Rex Y., 4,033,986, Cl. 260-345.200.

Heasman, Noel: *See—*
Gilpin, William Cecil; Heasman, Noel; and Williamson, John, 4,033,778, Cl. 106-58.000.

Heath Company: *See—*
Klauck, David E., 4,034,268, Cl. 361-111.000.

Heavens, Michael; James, Richard Charles; and Slinn, Dennis Stanley, to EMI Limited. Patient positioning and supporting arrangement. 4,034,224, Cl. 250-439.00P.

Heberlein & Co. AG: *See—*
Raschle, Josef, 4,033,106, Cl. 57-77.450.

Hebert, Gerald P., to Production Specialties, Inc. Well tubing mandrel with orienting sleeve with trash relieving slot. 4,033,409, Cl. 166-117.500.

Hecht, Ralph Julius, to United Technologies Corporation. Superalloy base having a coating containing silicon for corrosion/oxidation protection. 4,034,142, Cl. 428-678.000.

Heckman, LeRoy Francis, Jr.; and Pickard, James Bruce, to RCA Corporation. High power coaxial cavity resonator tunable over a broad band of frequencies. 4,034,320, Cl. 333-82.00B.

Hedrick, Ross M.; and Gabbert, James D., to Monsanto Company. Ester terminated terpolymers. 4,034,015, Cl. 260-857.0PG.

Hedstrom Co.: *See—*
Boudreau, Robert J., 4,033,622, Cl. 297-250.000.

Heeren, Richard H., to Teletype Corporation. Logic circuits and on-chip four phase FET clock generator made therefrom. 4,034,242, Cl. 307-269.000.

Heffner, George R., to Rohr Industries, Inc. Bus manufacturing mechanism and method. 4,033,033, Cl. 29-824.000.

Hegar, Gert: *See—*
Ramanathan, Visvanathan; Della Casa, Angelo; de Montmollin, Rene; Hegar, Gert; and Schutz, Hans Ulrich, 4,033,943, Cl. 260-153.000.

Heier, Robert J., to Owens-Illinois, Inc. Container line divider. 4,033,447, Cl. 198-441.000.

Heil, Walter: *See—*
Sommerkamp, Peter; and Heil, Walter, 4,034,256, Cl. 313-440.000.

Heimburger, Norbert: *See—*
Karges, Hermann Erich; Heimburger, Norbert; and Jacobi, Eckart, 4,033,824, Cl. 195-99.000.

Heintke, Hans Eberhard: *See—*
Gahler, Egon; Heintke, Hans Eberhard; and Dietrich, Rolf, 4,034,278, Cl. 320-1.000.

Heinzle, Otto. Form for pouring conically tapering concrete structures. 4,033,547, Cl. 249-193.000.

Helberg, Keith A.: *See—*
Nichols, Claude R.; and Helberg, Keith A., 4,033,742, Cl. 65-2.000.

Helgert, James F.: *See—*
Brolund, Theodore F.; and Helgert, James F., 4,033,216, Cl. 83-413.000.

Helland, John R.; and Stokes, Kenneth B., to Medtronic, Inc. Nonfibrosing cardiac electrode. 4,033,357, Cl. 128-418.000.

Helm, Rudolf: *See—*
Wedemeyer, Karlfried; and Helm, Rudolf, 4,034,042, Cl. 260-576.000.

Helting, Torsten Bertil, to Behringwerke Aktiengesellschaft. Derivatives of diphtheria toxin, process for preparing them and agents containing them. 4,033,819, Cl. 195-29.000.

Hems, Roger: *See—*
Rowsell, David G.; and Hems, Roger, 4,034,109, Cl. 424-311.000.

Hendricks, Charles D., to United States of America, Energy Research and Development Administration. Method for foam encapsulating laser targets. 4,034,032, Cl. 264-28.000.

Hendrickson, James B.: *See—*
Barcza, Sandor; and Hendrickson, James B., 4,034,045, Cl. 260-590.0FB.

Hendrix, Gerhard: *See—*
Frentzen, Hermann Josef; Hendrix, Gerhard; Huppertz, Manfred; Ritter, Hans Georg; and Wittek, Fritz, 4,033,568, Cl. 269-26.000.

Henkel & Cie G.m.b.H.: *See—*
Bruns, Klaus; and Meins, Peter, 4,033,993, Cl. 260-463.000.
Gruber, Werner; Galinke, Joachim; and Keil, Jurgen, 4,034,145, Cl. 526-328.000.
Ploger, Walter; Schmidt-Dunker, Manfred; and Gloxhuber, Christian, 4,034,086, Cl. 424-200.000.

Henrich, Helmut, to Siegerland-Bremsen, Firma. Self adjusting brake system. 4,033,434, Cl. 188-75.000.

Henrich, Robert Samuel, to Bendix Corporation, The. Electronic ignition timing system for an internal combustion engine. 4,033,272, Cl. 123-117.00R.

Heptner, Peter Josef, to Diamond Power Specialty Corporation. Thermal insulation assembly. 4,033,383, Cl. 138-149.000.

Hermann Berstorff Maschinenbau GmbH: *See—*
Anders, Dietmar, 4,033,556, Cl. 259-191.000.

Hermann, Theron: *See—*
Liu, Chao-Min; Palleroni, Norberto; Hermann, Theron; and Prosser, Barbara, 4,033,823, Cl. 195-80.00R.

Hermans, Matthias Leonardus, to U.S. Philips Corporation. Heating device comprising a heat accumulator. 4,033,130, Cl. 60-523.000.

Herrmann, Henry Otto, Jr.: *See—*
Glover, Douglas Wade; Askman, Jan Philip; and Herrmann, Henry Otto, Jr., 4,034,172, Cl. 200-51.100.

Herzan, Georg: *See—*
Fernandez, Eloy; Simeth, Claus; and Herzan, Georg, 4,033,261, Cl. 101-248.000.

Herzl, Peter J., to Fischer & Porter Co. Linear vortex-type flowmeter. 4,033,188, Cl. 73-194.0VS.

Herzl, Peter J.; and Metzger, Harold W., to Fischer & Porter Co. External-sensor vortex-type flowmeter. 4,033,189, Cl. 73-194.0VS.

Hesston Corporation: *See—*
Fritz, David Paul; Anderson, John Dale; Pruitt, Martin Eugene; Mahagan, Deroy Ernest; and Buller, Richard James, 4,033,101, Cl. 56-344.000.

Hetzel, Gert, to Siemens Aktiengesellschaft. Bipolar cutting electrode for high-frequency surgery. 4,033,351, Cl. 128-303.140.

Hetzler, Robert B.; and Pierson, Gerald L., to Chicago Pneumatic Tool Company. Hydraulic feed control system for rotary drill. 4,033,129, Cl. 60-486.000.

Hewlett-Packard Company: *See—*
Hanson, Delon C., 4,033,669, Cl. 350-96.00C.
Willis, Barry G.; Schade, Henry A., Jr.; and Farrell, Michael J., 4,033,330, Cl. 128-2.00G.

Hicks, Prentiss C.; and Turrentine, Fred C., to Artek Industries, Inc. Liquid material-dispensing apparatus. 4,033,481, Cl. 222-134.000.

Higgins, Charles T.: *See—*
Nienow, John F.; Higgins, Charles T.; and Meyer, Leo F., 4,033,360, Cl. 131-21.00B.

Higgins, Thomas D., Jr.; and Newsom, Raymond A., to Monsanto Company. Process for inhibiting polymerization of styrene during distillation. 4,033,829, Cl. 203-9.000.

Higgs, William York, to Intercontinental Marine Limited. Life saving equipment for vessels. 4,033,002, Cl. 9-14.000.

Hildebrandt, Eugene F.: *See—*
Crow, William D.; Ottersbach, Thomas V.; and Hildebrandt, Eugene F., 4,034,173, Cl. 200-80.00R.

Hill, Howard D. W.: *See—*
Tomlinson, Barrett L.; and Hill, Howard D. W., 4,034,191, Cl. 235-151.300.

Hill, James E.; Dahlstrom, Baesley I.; and Fisher, Robert D., to Dynetics Engineering Corporation. Credit card carriers and methods of manufacture. 4,034,210, Cl. 235-61.12N.

Hill, John; and Turczanski, Henryk, to Comtelco (U.K.) Limited. Temperature sensitive trip device. 4,034,326, Cl. 337-34.000.

Hill, John Anthony; Katz, Irwin A.; and Murphy, John H., to E. R. Squibb & Sons, Inc. Ointments and powders containing sebacic acid. 4,034,077, Cl. 424-69.000.

Hill, William G.: *See—*
Fredd, John V.; and Hill, William G., 4,033,408, Cl. 166-75.00R.

Hillman, Carl E., Jr.: *See—*
United States of America, National Aeronautics and Space Administration; Frost, James D., Jr.; and Hillman, Carl E., Jr., 4,033,334, Cl. 128-2.10E.

Hillstrom, David U., to Sarkisian, Robert. Mounting bracket coil spring. 4,033,536, Cl. 248-160.000.

Hioki, Kazuo: *See—*
Sugihara, Kunihiko; Hioki, Kazuo; and Muranaka, Shigeo, 4,033,306, Cl. 123-119.00A.

Hirakawa, Kenkichi: *See—*
Shikiya, Hajime; Nakanishi, Seiichi; Yoshida, Zitsuo; and Hirakawa, Kenkichi, 4,033,197, Cl. 74-331.000.

Hirayama, Kazuhiro; Tsukada, Syusei; and Inoue, Takahiro, to Canon Kabushiki Kaisha. Cathode ray tube pickup device. 4,033,687, Cl. 355-1.000.

Hirono, Yoshihiko: *See—*
Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; and Ishikawa, Hisao, 4,033,754, Cl. 71-112.000.

Hirosawa, Koichiro; Ishikawa, Kazuo; Ogasawara, Tsunehiko; and Murakami, Noboru, to Aisin Seiki Kabushiki Kaisha. Hydraulic control system for vehicle transmission means. 4,033,203, Cl. 74-869.000.

Hirsch, Arthur Edward, to J. I. Case Company. Two-way fluid pressure relief valve. 4,033,375, Cl. 137-493.900.

Hirsch, Nathan: *See—*
Hunsperger, Robert G.; and Hirsch, Nathan, 4,033,788, Cl. 148-1.500.

Hitco: *See—*
Babayan, Eduard P., 4,034,138, Cl. 428-378.000.

Hjern, Lasse O.: *See—*
Almqvist, Sven-Olof; Enzell, Curt R.; Hjern, Lasse O.; Artho, Antoine; and Koch, Robert, 4,033,362, Cl. 131-264.000.

Hobin, Martin A.: *See—*
Mockrin, Isadore; and Hobin, Martin A., 4,033,838, Cl. 204-103.000.

Hoechst Aktiengesellschaft: *See—*
Bollert, Ulrich; Lohmar, Elmar; and Ohorodnik, Alexander, 4,033,936, Cl. 260-75.00P.
John, Veit, 4,033,307, Cl. 123-119.00A.
Martini, Thomas, 4,033,984, Cl. 260-340.600.
Meininger, Fritz; Hunger, Klaus; and Springer, Hartmut, 4,033,980, Cl. 260-314.500.
Moraw, Roland, 4,033,690, Cl. 355-9.000.
Moraw, Roland; and Schadlich, Gunther, 4,034,381, Cl. 346-151.000.
Sader, George; and Osswald, Dieter, 4,033,695, Cl. 355-87.000.
Strutzel, Hans; Gneuss, Detlef; and Klenk, Ludwig, 4,034,055, Cl. 264-95.000.
Uhlig, Fritz, 4,034,183, Cl. 219-122.0LM.

Hoehn, Hans; Bernstein, Jack; and Vogt, Berthold Richard, to E. R. Squibb & Sons, Inc. Various 1,5,10,11-tetrahydrobenzo [4,5]-cyclohepta [1,2-b]pyrazolo[4,3-e]pyridine derivatives. 4,033,970, Cl. 260-293.610.

Hoernle, Hans R.: *See—*
Gregorian, Razmic S.; and Hoernle, Hans R., 4,034,134, Cl. 428-86.000.

Hoetger, Robert Arthur; Hagaman, James Albert; and Nortman, William, to Chrysler Corporation. Transmission and torque converter with lock-up clutch. 4,033,436, Cl. 192-3.300.

Hofer, Kurt; and Tscheulin, Guenther, to Sandoz Ltd. Triazine derivatives as stabilizers for organic materials. 4,033,957, Cl. 260-246.00B.

Hofer, Peter H., to John Z. Delorean Corporation. Composite sheet structure and method for manufacturing same. 4,034,137, Cl. 428-308.000.

Hoffman, Herbert N.: *See—*
Nutter, Norman E.; and Hoffman, Herbert N., 4,033,234, Cl. 91-384.000.

Hoffman-La Roche Inc.: *See—*
Rosen, Perry, 4,033,962, Cl. 260-256.40N.

Hoffman, Mary V., to General Electric Company. Mercury vapor lamp utilizing a combination of phosphor materials. 4,034,257, Cl. 313-487.000.

Hoffman, William W.: *See—*
Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., 4,034,040, Cl. 260-570.900.

Hoffmann, Hellmut; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. O-[1-Alkoxyphosphoryl-3-methyl-pyrazol(5)yl]-(thiono)-phosphoric acid esters and ester amides. 4,034,085, Cl. 424-200.000.

Hoffmann-La Roche Inc.: *See—*
Free, John Marshall; and Jeunelot, Charles William, 4,034,339, Cl. 340-146.10C.
Liu, Chao-Min; Palleroni, Norberto; Hermann, Theron; and Prosser, Barbara, 4,033,823, Cl. 195-80.00R.
Mitrovic, Milan; and Hayes, Terence James, 4,034,110, Cl. 424-311.000.

Hoffmann, Otto L., to Gulf Research & Development Company. Dichloroacetamide treated rice seeds. 4,033,756, Cl. 71-118.000.

Hogan, Al: *See—*
Wheatley, Charles; Schuller, Ronald A.; and Hogan, Al, 4,033,550, Cl. 251-328.000.

Hoinash, Lynne E., to Sage Laboratories, Inc. Handles for supporting a dish or the like in a microwave oven. 4,033,009, Cl. 16-114.00R.

Hokushin Electric Works, Ltd.: *See—*
Minami, Hiroshi, 4,034,237, Cl. 307-268.000.

Holcombe, Thomas Charles; and Schultz, Robert Howard, to Procter & Gamble Company, The. Photoactivated bleaching process. 4,033,718, Cl. 8-103.000.

Hollingsworth, Gene C.: *See—*
Freehauf, Eugene G.; Hollingsworth, Gene C.; and Welsh, David Edward, 4,033,656, Cl. 339-17.0CF.

Hollis, John Edward, to Plessey Handel und Investments A.G. Transmission networks for telephone system. 4,034,166, Cl. 179-170.0NC.

Hollon, Edmund D.: *See—*
Morton, Scott A., 4,033,712, Cl. 431-90.000.

Holloway, Richard L.; Edison, Robert R.; and Wachtel, Stephen J., to Atlantic Richfield Company. Reduced nitrogen content of hydrocarbon fraction by catalytic polymerization. 4,033,861, Cl. 208-211.000.

Holmes, G. Thomas, to Aluminum Company of America. Electrolytic reduction cell. 4,033,836, Cl. 204-67.000.

Holmes, James J.: *See—*
Sprung, Joseph A.; Panasik, Theodore; and Holmes, James J., 4,033,772, Cl. 96-114.000.

Holt, Amos E.; and Roseveare, Ronald N., to Babcock & Wilcox Company, The. Fluid coupled test probe. 4,033,178, Cl. 73-71.5US.

Holt, Frank: *See—*
Steel, Margaret Lillian; and Holt, Frank, Re. 29,295.

Holt, Fred E.; Cash, Robert J.; and Schenter, Robert E., to United States of America, Energy Research and Development Administration. Method of detecting leakage of reactor core components of liquid metal cooled fast reactors. 4,033,813, Cl. 176-19.0LD.

Holt, James Tyler, to Bell Telephone Laboratories, Incorporated. Telephone receiver-off-hook detector. 4,034,162, Cl. 179-18.0AB.

Holtman, William H.: *See—*
Hardway, Edward V., Jr.; and Holtman, William H., 4,033,332, Cl. 128-2.00S.

Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., to Halliburton Company. Methods for fracturing well formations. 4,033,415, Cl. 166-308.000.

Holtrop, John W., to United States of America, Navy. Liquid propellant gun. 4,033,224, Cl. 89-7.000.

Homma, Rokuro, to Oki Electric Industry Company, Ltd. Magnetic relay. 4,034,323, Cl. 335-129.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Asaka, Urataro; Yamazaki, Shuichi; Niitsu, Mitsugi; and Arai, Sakuji, 4,033,124, Cl. 60-290.000.

Honeywell Inc.: *See—*
Abdelrahman, Mona M., 4,034,395, Cl. 357-28.000.
Foreman, Donald S., 4,034,240, Cl. 307-252.00F.
Marshall, James F., 4,033,787, Cl. 148-1.500.

Honeywell Information Systems, Inc.: *See—*
Kindell, Jerry L., 4,034,198, Cl. 235-164.000.
Rathbun, Donald J., 4,034,348, Cl. 364-200.000.

Honjo, Satoru: *See—*
Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.

Hood, John William: *See—*
Tobey, Hubert Earl; Hood, John William; Masiuk, Alphonse Michael; Irvin, Dee Lavern; and Moller, George Otto, 4,033,254, Cl. 101-44.000.

Hooker Chemicals & Plastics Corporation: *See—*
Curtis, M. David, 4,034,069, Cl. 423-489.000.
Duffy, James J.; Carlson, Richard D.; and Watson, James C., 4,034,141, Cl. 428-473.000.
Quintilliano, Robert L., 4,033,407, Cl. 165-95.000.

Hoover Ball and Bearing Company: *See—*
Greenquist, Duane R., 4,033,476, Cl. 220-334.000.

Hopeman Brothers, Inc.: *See—*
Shiflet, Frank L., 4,033,084, Cl. 52-573.000.

Hopkins, Henry S., Jr.; and Vargo, Donald L., to General Latex and Chemical Corporation. Polyisocyanurate compositions and foams of improved friability and process of preparing same. 4,033,908, Cl. 260-2.5AW.

Hoppe, William C.; and Hanson, Theodore L., to Vendo Company, The. Dispensing apparatus having product access door sequential control mechanism. 4,033,477, Cl. 221-114.000.

Hoppough, Richard Scott, to Bell Telephone Laboratories, Incorporated. Telephone receiver-off-hook detector. 4,034,161, Cl. 179-18.0AB.

Hora, Charles J.: *See—*
Strempel, Thomas G.; and Hora, Charles J., 4,033,848, Cl. 204-284.000.

Horie, Kiyoshi: *See—*
Ohmori, Hitoshi; and Horie, Kiyoshi, 4,033,293, Cl. 118-653.000.

Horiishi, Nanao: *See—*
Matsui, Goro; Toda, Koji; Shimizu, Shigeki; Horiishi, Nanao; and Takedoi, Atushi, 4,033,891, Cl. 252-62.560.

Horizons Incorporated, a division of Horizons Research Incorporated: *See—*
Lewis, James Marvin; and Newyear, Raymond Willis, 4,033,773, Cl. 96-115.00P.

Horn, Hans, to Gertsch AG. Safety ski binding. 4,033,603, Cl. 280-618.000.

Horowitz, Carl; and Dichter, Michael, to Polygulf Associates. Process for treating coal and products produced thereby. 4,033,852, Cl. 208-8.000.

Horsewell, Henry George; and Harris, Ian Richard, to Brown & Williamson Tobacco Corporation. Tobacco-smoke filters. 4,033,361, Cl. 131-262.00A.

Horst, William R.; and Hale, William J., to NCR Corporation. System and method for providing a security check on a credit card. 4,034,211, Cl. 235-61.12N.

Hosaka, Hideo; and Yoneda, Hiromi, to Nippon Soda Company Limited. Herbicidal composition. 4,033,750, Cl. 71-90.000.

Hoshi, Sadao, to Chitose Corporation. Hair tweezer device. 4,033,350, Cl. 128-303.130.

Hoskins, Nathan D. Wrench for container closures. 4,033,205, Cl. 81-3.420.

Hossbach, Rudolf: *See—*
Eiselt, Gunter; and Hossbach, Rudolf, 4,033,213, Cl. 83-56.000.

Hostein, Claude, to Compagnie Honeywell Bull (Societe Anonyme). Interface for establishing communications between a data-processing unit and a plurality of stations. 4,034,346, Cl. 364-900.000.

Hotchkiss, LaVerne C., to United States of America, Army. Phase control of clock and sync pulser. 4,034,352, Cl. 364-200.000.

House, Bruce F., to Shelley Manufacturing Company Division of Alco Food Service Equipment Company. Cup dispenser. 4,033,478, Cl. 221-279.000.

Houseman, John; and Cerini, Donald J., to California Institute of Technology. Start up system for hydrogen generator used with an internal combustion engine. 4,033,133, Cl. 60-606.000.

Houston Systems, Inc.: *See—*
Stine, Joe C., 4,033,465, Cl. 214-13.000.

Howe, Hans-Ulrich, to Klockner-Humboldt-Deutz Aktiengesellschaft. Crankcase for multi-cylinder reciprocable piston internal combustion engines. 4,033,312, Cl. 123-196.00R.

Howie, David Malcolm; McKenzie, Roy Victor W.; and Snape, James Ronald, to Pyrotenax of Canada Limited. Method of making heating cables. 4,033,028, Cl. 29-611.000.

Howley, Frank E.; Jones, John W.; and Logue, Joseph C., to International Business Machines Corporation. Reconfigurable logic array. 4,034,356, Cl. 340-173.00R.

Hrdlicka, Eugene R.; Vincolese, George J.; and Szuberla, John H., to GTE Automatic Electric Laboratories Incorporated. Test jack for mounting on printed circuit boards. 4,034,157, Cl. 179-1.0PC.

Hubbard, Harold C., to Motor Wheel Corporation. Remote control circuit for electric trailer brakes. 4,033,630, Cl. 303-7.000.

Hudgens, Bernard C., to TRW Inc. Method of making a slip joint. 4,033,020, Cl. 29-149.5NM.

Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A., to Pennwalt Corporation, S.S. White Dental Products Division. Film drive mechanism for panoramic radiographic apparatus. 4,034,225, Cl. 250-471.000.

Hudspeth, Henry S. Precision measuring device. 4,033,190, Cl. 73-426.000.

Huege, Fred R.: *See—*
Jameson, M. Phillip; and Huege, Fred R., 4,034,058, Cl. 423-118,000.

Hughes Aircraft Company: *See—*
Basiulis, Algred, 4,033,406, Cl. 165-32.000.
Brian, Jack, 4,034,402, Cl. 358-114.000.
Dill, Hans G.; and Toombs, Thomas N., 4,033,797, Cl. 148-187.000.
Hunsperger, Robert G.; and Hirsch, Nathan, 4,033,788, Cl. 148-1.500.
Lutz, Michael A., 4,034,260, Cl. 315-344.000.
Lutz, Michael A.; and Harvey, Robin J., 4,034,261, Cl. 315-344.000.

Hughes, Garyth: *See—*
Bickerdike, Robert Lewis; Clark, Douglas; Eastabrook, John Norman; Hughes, Garyth; Mair, William Norman; Partridge, Peter George; and Ranson, Harry Christopher, 4,033,793, Cl. 148-32.000.

Hughes, John L.; Seyler, Jay K.; and Liu, Robert C., to Armour Pharmaceutical Company. Cyclization of peptides. 4,033,940, Cl. 260-112.50S.

Huls, Friedrich: *See—*
Biller, Horst; and Huls, Friedrich, 4,033,164, Cl. 72-205.000.

Humber, Leslie G.: *See—*
Philipp, Adolf H.; and Humber, Leslie G., 4,033,977, Cl. 260-302.00F.

Hunger, Klaus: *See—*
Meininger, Fritz; Hunger, Klaus; and Springer, Hartmut, 4,033,980, Cl. 260-314.500.

Hunsperger, Robert G.; and Hirsch, Nathan, to Hughes Aircraft Company. Ion implanted gallium arsenide semiconductor devices fabricated in semi-insulating gallium arsenide substrates. 4,033,788, Cl. 148-1.500.

Huppertz, Manfred: *See—*
Frentzen, Hermann Josef; Hendrix, Gerhard; Huppertz, Manfred; Ritter, Hans Georg; and Wittek, Fritz, 4,033,568, Cl. 269-26.000.

Huss, Heinrich. Apparatus for developing a travelling photographic emulsion carrier. 4,034,389, Cl. 354-322.000.

Husson, Henri Philippe: *See—*
Sevenet, Thierry; Thal, Claude; Potier, Pierre; and Husson, Henri Philippe, 4,033,969, Cl. 260-293.530.

Hutton, Robert Gordon; and Merry, Trevor, to American Bank Note Company. Documents of value including intaglio printed transitory images. 4,033,059, Cl. 40-137.000.

Hyatt, Gilbert P. Digital signal processor for servo velocity control. 4,034,276, Cl. 318-608.000.

Hydromatik GmbH: *See—*
Wagenseil, Ludwig, 4,033,238, Cl. 91-505.000.

Ichikawa Hoseki Kabushiki Kaisha: *See—*
Ichikawa, Yoshitomo, 4,033,591, Cl. 274-23.00R.

Ichikawa, Yoshitomo, to Ichikawa Hoseki Kabushiki Kaisha. Pick-up arm rotary pivot bearing structure. 4,033,591, Cl. 274-23.00R.

Ichioka, Satoshi: *See—*
Kobayashi, Toshihiko; Kanbayashi, Tetsusaburo; Ichioka, Satoshi; Takeuchi, Shinjiro; and Matsushima, Yukinori, 4,034,180, Cl. 219-85.0BM.

ICI Australia Limited: *See—*
Bolza, Frederick; Sadek, Lubos Vojtech; and Fox, Richard, 4,033,264, Cl. 102-24.00R.

Ideal Industries, Inc.: *See—*
Hanson, Ronald P., 4,033,614, Cl. 285-248.000.
Peplow, Marvin J.; and Wells, Peter M., Jr., 4,034,284, Cl. 324-51.000.

Ieki, Hideharu: *See—*
Ishiyama, Hideki; Inoue, Atushi; and Ieki, Hideharu, 4,034,318, Cl. 333-72.000.

Igarashi, Yutaka: *See—*
Uemura, Michihiko; Kanbara, Tohru; and Igarashi, Yutaka, 4,034,317, Cl. 333-30.00R.

Igwebike, Kingsley. Vibratory feminine hygiene vacuum device. 4,033,338, Cl. 128-36.000.

Ikarimoto, Yasuaki, to Sunwa Sharyo Mfg. Co., Ltd. Stairway-climbing cart. 4,033,421, Cl. 180-8.00A.

Illinois Tool Works Inc.: *See—*
Bloink, Harry William, 4,033,018, Cl. 29-105.00A.
Weaver, William Norfred, 4,033,457, Cl. 206-390.000.

Imai, Hirozo; and Maeda, Yasuo, to Matsushita Electric Works, Ltd. Inner blade member for electric dry shaver. 4,033,034, Cl. 30-43.920.

Imai, Isao, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Looper. 4,033,492, Cl. 226-25.000.

IMC Chemical Group, Inc.: *See—*
Briedis, Juozas; and Jurisch, Louis A., 4,033,976, Cl. 260-299.000.

Immer, Hans U.: *See—*
Ferland, Jean-Marie; Failli, Amedeo; Immer, Hans U.; and Gotz, Manfred K., 4,033,974, Cl. 260-295.50R.

Imperial Chemical Industries Limited: *See—*
Borthwick, James; and Morman, James Forrester, 4,033,359, Cl. 131-17.0AC.
Maisey, Roy Frederick, 4,033,951, Cl. 260-243.00R.
Smith, Leslie Harold, 4,034,106, Cl. 424-304.000.
Smith, Leslie Harold, 4,034,112, Cl. 424-321.000.

Imperial Chemical Industries Limited: *See—*
Steel, Margaret Lillian; and Holt, Frank, Re. 29,295.

Inada, Masami; Kawabata, Yasuhiro; and Sato, Katsujiro, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. Air flow control means for automobile engine exhaust gas cleaning means. 4,033,125, Cl. 60-290.000.

Industrial Resources, Inc.: *See—*
Rosar, Edward C.; Dulin, Jacques M.; Genco, Joseph M.; and Rosenberg, Harvey S., 4,034,063, Cl. 423-244.000.

Ing. C. Olivetti & C., S.p.A.: *See—*
Oddicini, Giuseppe, 4,033,445, Cl. 197-151.000.

Ing. C. Olivetti & C., S.p.A. Ufficio Brevetti: *See—*
Dalmasso, Claudio, 4,033,672, Cl. 350-160.0LC.

Inoue, Atushi: *See—*
Ishiyama, Hideki; Inoue, Atushi; and Ieki, Hideharu, 4,034,318, Cl. 333-72.000.

Inoue, Morio: *See—*
Itoh, Kunio; and Inoue, Morio, 4,034,311, Cl. 331-94.50H.

Inoue, Mutsuhiro: *See—*
Uno, Keiichi; and Inoue, Mutsuhiro, 4,033,685, Cl. 353-82.000.

Inoue, Takahiro: *See—*
Hirayama, Kazuhiro; Tsukada, Syusei; and Inoue, Takahiro, 4,033,687, Cl. 355-1.000.

Institut Francais du Petrole, des Carburants et Lubrifiants: *See—*
Chevalier, Andre, 4,033,612, Cl. 285-149.000.

Instrumentation Laboratory, Inc.: *See—*
Haddad, Ihsan A.; and Arsenault, Alvin R., 4,033,825, Cl. 195-127.000.

Intamin AG: *See—*
Spieldiener, Robert; Spieldiener, Reinhold; and Saiko, Alphons, 4,033,602, Cl. 280-605.000.

Intel Corporation: *See—*
Pashley, Richard D., 4,033,026, Cl. 29-571.000.

Intercontinental Marine Limited: *See—*
Higgs, William York, 4,033,002, Cl. 9-14.000.

International Business Machines Corporation: *See—*
Berry, Brian S.; and Pritchet, Walter C., 4,033,795, Cl. 148-108.000.
Briska, Marian; and Eisenbraun, Ewald, 4,034,130, Cl. 427-248.00C.
Buron, Rene Henri, 4,034,159, Cl. 179-15.0AT.
Demsky, Herbert M.; Mathisen, Einar S.; Schumann, Paul A., Jr.; and Tong, Alvin H., 4,033,698, Cl. 356-173.000.
Firdaus, Asad, 4,033,173, Cl. 73-37.000.
Fleck, Harry Ronald; and Mignosa, Charles Philip, 4,034,133, Cl. 428-64.000.
Howley, Frank E.; Jones, John W.; and Logue, Joseph C., 4,034,356, Cl. 340-173.00R.
Kraemer, Edward Joseph; and Patel, Tulsidas Ramlal, 4,034,411, Cl. 360-98.000.
Love, Robert D.; Cullen, James W.; and Kruppa, Robert W., 4,034,243, Cl. 307-304.000.
Mehta, Kay Beharat; and Voegeli, Otto, 4,034,357, Cl. 340-174.0TF.
Seki, Hajime, 4,033,673, Cl. 350-160.00R.
Vaughn, Julian Edgar, 4,034,309, Cl. 331-1.00A.

International Combustion Australia Limited: *See—*
Brander, James Edward, 4,033,193, Cl. 74-61.000.

International Paper Company: *See—*
La Rosa, John, 4,033,353, Cl. 128-351.000.

International Publishing Corporation Ltd.: *See—*
Owen, David Gregory; Ashworth, John Vernon; and Radcliffe, Paul Anthony Beaufort, 4,034,400, Cl. 358-75.000.

International Standard Electric Corporation: *See—*
Barton, Paul, 4,034,376, Cl. 343-112.00R.
Sterling, Henley F.; and Drake, Miles P., 4,033,832, Cl. 204-15.000.

International Synthetic Rubber Company, Limited, The: *See—*
Moore, John David; and Wheeler, Ian Robert, 4,034,020, Cl. 260-880.00R.

International Telephone and Telegraph Corporation: *See—*
Kruger, Bradford E., 4,034,374, Cl. 343-16.00R.
Tobey, Hubert Earl; Hood, John William; Masiuk, Alphonse Michael; Irvin, Dee Lavern; and Moller, George Otto, 4,033,254, Cl. 101-44.000.

Interroyal Corporation: *See—*
Benoit, Roland A.; and Duprey, Richard H., 4,033,639, Cl. 308-3.600.

Inzana, Margaret; and Terrett, Joann. Eye make-up shield. 4,033,364, Cl. 132-88.500.

Irvin, Dee Lavern: *See—*
Tobey, Hubert Earl; Hood, John William; Masiuk, Alphonse Michael; Irvin, Dee Lavern; and Moller, George Otto, 4,033,254, Cl. 101-44.000.

Isayama, Takuro, to Ricoh Co., Ltd. Ink ejection apparatus for printer. 4,034,380, Cl. 346-140.00R.

Ishikawa, Hisao: *See—*
Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; and Ishikawa, Hisao, 4,033,754, Cl. 71-112.000.

Ishikawa, Kazuo: *See—*
Hirosawa, Koichiro; Ishikawa, Kazuo; Ogasawara, Tsunehiko; and Murakami, Noboru, 4,033,203, Cl. 74-869.000.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Imai, Isao, 4,033,492, Cl. 226-25.000.
Ueno, Masayuki; and Sano, Fumiaki, 4,033,565, Cl. 266-273.000.

Ishiyama, Hideki; Inoue, Atushi; and Ieki, Hideharu, to Murata Manufacturing Co., Ltd. Elastic surface wave filter. 4,034,318, Cl. 333-72.000.

Ishizaka, Sunao; and Kawahara, Yasuhito, to Nippon Kogaku K.K. Exposure indicator device in a single lens reflex camera with a TTL exposure meter contained therein. 4,034,392, Cl. 354-289.000.

Isono, Tomoyuki; and Nakada, Toshio, to Nippon Electric Company, Ltd. Automatic postal-code-number reading system. 4,034,341, Cl. 340-146.30H.

Isozaki, Osamu; Watanabe, Tadashi; and Sakamoto, Masahiro, to Kansai Paint Company, Ltd. Process for producing unsaturated resin emulsion. 4,033,920, Cl. 260-29.60H.

Ito, Fumio: *See—*
Mashimo, Yukio; Ito, Tadashi; Shinoda, Nobuhiko; Sakurada, Nobuaki; and Ito, Fumio, 4,034,383, Cl. 354-23.00D.

Ito, Jiro: *See—*
Aoki, Yutaka; Hase, Akira; and Ito, Jiro, 4,033,728, Cl. 44-1.00R.

Ito, Tadashi: *See—*
Mashimo, Yukio; Ito, Tadashi; Shinoda, Nobuhiko; Sakurada, Nobuaki; and Ito, Fumio, 4,034,383, Cl. 354-23.00D.

Itoh, Kunio; and Inoue, Morio, to Matsushita Electronics Corporation. Semiconductor laser. 4,034,311, Cl. 331-94.50H.

Iwashita, Tomonori; and Kozuki, Susumu, to Canon Kabushiki Kaisha. Film transport driving and braking apparatus for a photographic camera. 4,034,388, Cl. 354-173.000.

Iwataki, Isao: *See—*
Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; and Ishikawa, Hisao, 4,033,754, Cl. 71-112.000.

J. C. Penney Company: *See—*
Jay, Aubrey; and Jacobs, Maurice A., 4,032,989, Cl. 2-73.000.

J. F. Pritchard and Company: *See—*
Swenson, Leonard K., 4,033,735, Cl. 62-9.000.

J. I. Case Company: *See—*
Hirsch, Arthur Edward, 4,033,375, Cl. 137-493.900.
Moehle, Kenneth Albert; and Taschner, Raymond George, 4,033,542, Cl. 248-358.0AA.
Parquet, Donald James; and Pedersen, Carl Oluf, 4,033,870, Cl. 210-90.000.

J.I.M. Corporation: *See—*
Stanfield, Jay E., 4,033,576, Cl. 271-5.000.

J. M. Voith GmbH: *See—*
Schiel, Christian; and Flamig, Hans, 4,033,049, Cl. 34-115.000.

J. P. Stevens & Co., Inc.: *See—*
Pensa, Ildo Emil; and Rau, Robert Otto, 4,032,992, Cl. 2-243.00R.

J. P. Tool, Inc.: *See—*
Peuterbaugh, Bruce G., 4,033,207, Cl. 82-2.00E.

J & S Tool Company, Inc.: *See—*
Swenson, Henry F., 4,033,210, Cl. 82-31.000.
Swenson, Henry F., 4,033,211, Cl. 82-33.00R.

J. T. Baker Chemical Company: *See—*
Barnard, Alfred J., Jr.; and Lance, Russell C., Jr., 4,033,897, Cl. 252-408.000.

Jackson, James J., to Veeder Industries, Inc. Electronic access control system. 4,034,193, Cl. 235-151.340.

Jackson, John Lambert: *See—*
Archibald, John Leheup; and Jackson, John Lambert, 4,034,098, Cl. 424-267.000.

Jackson, Richard L.: *See—*
Stilz, John G.; and Jackson, Richard L., 4,033,941, Cl. 260-112.50R.

Jacob Amstutz: *See—*
Amstutz, Jacob; and Amstutz, Paul G., 4,033,127, Cl. 60-435.000.

Jacob, David S.: *See—*
United States of America, National Aeronautics and Space Administration; and Jacob, David S., 4,033,479, Cl. 222-61.000.

Jacobi, Eckart: *See—*
Karges, Hermann Erich; Heimburger, Norbert; and Jacobi, Eckart, 4,033,824, Cl. 195-99.000.

Jacobi, Edgar F.; and Madden, Mark R. Automated irrigation system. 4,033,508, Cl. 239-177.000.

Jacobs, Maurice A.: *See—*
Jay, Aubrey; and Jacobs, Maurice A., 4,032,989, Cl. 2-73.000.

Jacobson, Ralph Spencer. Screw and screw driver. 4,033,244, Cl. 85-45.000.

Jacobson, Robert L.; and Ormiston, Robert M., to Chevron Research Company. In situ hydrocarbon conversion catalyst regeneration without sulfur contamination of vessels communicating with catalyst reactor. 4,033,898, Cl. 252-416.000.

Jacoel, Rafael: *See—*
Maioglio, Mauro; and Jacoel, Rafael, 4,033,305, Cl. 123-117.00D.

Jacques, Donald F.; and Lange, K. Robert, to Betz Laboratories, Inc. Chromate reduction in aqueous medium. 4,033,867, Cl. 210-28.000.

Jaffe, Walther, to Lebema Eledtriska Aktiebolag. Marking tapes for marking articles. 4,033,057, Cl. 40-21.00R.

Jahnke, Frederick C.: *See—*
Colvert, James H.; Jahnke, Frederick C.; and Williams, Dale, 4,033,856, Cl. 208-102.000.
Williams, Dale; Colvert, James H.; and Jahnke, Frederick C., 4,033,857, Cl. 208-102.000.

Jaki, Friedrich: *See—*
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, 4,033,315, Cl. 123-146.50A.

Jakobs, Willy; and Kryczun, Alfred, to Klockner-Humboldt-Deutz Aktiengesellschaft. Device for the separation of mixtures of at least partially molten metals, metal compounds and/or metal-containing slags in a centrifugal force field. 4,033,563, Cl. 266-204.000.

James B. Carter Limited: *See—*
Windsor, Lynne E.; and Smorang, Lawrence, 4,034,204, Cl. 219-368.000.

James, Richard Charles: *See—*
Heavens, Michael; James, Richard Charles; and Slinn, Dennis Stanley, 4,034,224, Cl. 250-439.00P.

Jameson, M. Phillip; and Huege, Fred R., to Engelhard Minerals & Chemicals Corporation. Method for producing synthetic sodium aluminosilicate ion-exchange material from calcined kaolin clay. 4,034,058, Cl. 423-118.000.

Janome Sewing Machine Co.: *See—*
Kasuga, Noboru, 4,033,273, Cl. 112-274.000.

Janoski, Edward J.: *See—*
Schneider, Abraham; and Janoski, Edward J., 4,033,799, Cl. 149-120.000.

Jansen, Josephus Johannes Maria, to Koninklijke Textielfabrieken. Liquid separation of sock string. 4,033,151, Cl. 66-147.000.

Janssen, Peter Johannes Hubertus, to U.S. Philips Corporation. Television facsimile transmission system. 4,034,405, Cl. 358-147.000.

Jarnuszkiewicz, Stanislaw, to Politechnika Krakowska. Four-stroke, multicylinder, spark ignition, fuel injection internal combustion engine. 4,033,302, Cl. 123-59.0BM.

Jarrett, James Oswald: *See—*
Jarrett, William Fleming Hoggan; Jarrett, James Oswald; and Mackey, Lindsay Joan, 4,034,081, Cl. 424-89.000.

Jarrett, William Fleming Hoggan; Jarrett, James Oswald; and Mackey, Lindsay Joan, to University of Glasgow. Vaccines against feline leukemia. 4,034,081, Cl. 424-89.000.

Jay, Aubrey; and Jacobs, Maurice A., to J. C. Penney Company. Garment liner. 4,032,989, Cl. 2-73.000.

Jeffries Truck Parts & Equipment, Inc.: *See—*
Cameron, John Stratton, 4,033,607, Cl. 280-711.000.

Jenkins, David Conwil: *See—*
King, Leslie George; Lee, Glyn Evan; Martin, George Christopher James; and Jenkins, David Conwil, 4,034,107, Cl. 424-309.000.

Jennison, James M.; and Williams, Henry Thomas, to Thompson Manufacturing Company. Arc-traversing water sprinkler. 4,033,510, Cl. 239-230.000.

Jentoft, Arthur P.; and Couture, Paul A., to Wasco Products, Inc. Vent. 4,033,246, Cl. 98-42.00R.

Jentzsch, Arndt: *See—*
Johne, Hans; Jentzsch, Arndt; and Schumann, Gunter, 4,033,262, Cl. 101-350.000.

Jeunelot, Charles William: *See—*
Free, John Marshall; and Jeunelot, Charles William, 4,034,339, Cl. 340-146.10C.

John, Veit, to Hoechst Aktiengesellschaft. Process and device for preparing ignitable fuel mixtures. 4,033,307, Cl. 123-119.00A.

John Wyeth & Brother Limited: *See—*
Archibald, John Leheup; and Jackson, John Lambert, 4,034,098, Cl. 424-267.000.
Tipton, Peter William, 4,033,809, Cl. 156-572.000.

John Z. Delorean Corporation: *See—*
Hofer, Peter H., 4,034,137, Cl. 428-308.000.

John Zink Company: *See—*
Reed, Robert D.; and McGill, Eugene C., 4,033,725, Cl. 23-277.00C.

Johne, Hans; Jentzsch, Arndt; and Schumann, Gunter, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Ink applicator for printing apparatus. 4,033,262, Cl. 101-350.000.

Johns, Gordon L.: *See—*
Murawski, Frank H.; Elliott, James W.; Richards, Fred W.; and Johns, Gordon L., 4,033,336, Cl. 128-2.05R.

Johnsen, Edward L. Multi-ply lottery tickets or like articles, continuous business form and method for producing same. 4,033,611, Cl. 283-6.000.

Johnson, Clifford T.; and McCubbin, Melvin J., to United States of America, Navy. Anti-compromise device. 4,033,265, Cl. 102-56.0SC.

Johnson Controls, Inc.: *See—*
Matthews, Russell B., 4,034,270, Cl. 361-256.000.

Johnson, Edwin Samuel; and White, Wilfrid Francis, to Abbott Laboratories. Method to prevent reproduction in warm-blooded female animals with nonapeptides. 4,034,082, Cl. 424-177.000.

Johnson, Ernest Carlisle: *See—*
Wortham, Joseph Sidney; and Johnson, Ernest Carlisle, 4,034,120, Cl. 426-531.000.

Johnson, Harold L., to Deering Milliken Research Corporation. Electronic control system for dyeing and printing materials. 4,033,154, Cl. 68-205.00R.

Johnson, Howard L.; and Junck, John A., to Caterpillar Tractor Co. All hydraulic motor grader circuitry. 4,033,236, Cl. 91-463.000.

Johnson & Johnson: *See—*
Cepuritis, Talivaldis, 4,033,348, Cl. 128-287.000.
Klepak, Philip B.; Richardson, David I.; and Fourman, Robert G., 4,033,365, Cl. 132-89.000.
Scrivens, George W., 4,033,341, Cl. 128-132.00D.

Johnson, Norman A.: *See—*
Fritz, Thomas W.; Gilbo, Charles F.; and Johnson, Norman A., 4,033,083, Cl. 52-484.000.

Johnson, Oliver Wendell, to Eaton Corporation. Controller for fluid pressure operated devices. 4,033,377, Cl. 137-596.000.

Johnson, Paul A.; and Pinkalla, Hamilton A. Dental impression compound. 4,033,774, Cl. 106-35.000.

Johnson, Perry L.: *See—*
Wadge, James C.; Falvey, Henry T.; and Johnson, Perry L., 4,033,704, Cl. 415-80.000.

Johnson, Rodney L.: *See—*
Zinsmeyer, Herbert G.; Johnson, Rodney L.; Genz, Ralph H.; and Setliff, James E., 4,033,883, Cl. 250-231.0SE.

Johnson, Thomas E., to Chas. S. Lewis & Co., Inc. Ductile corrosion resistant alloy. 4,033,767, Cl. 75-170.000.

Johnston, James D.; Sanders, Robert N.; and Wood, James M., Jr., to Ethyl Corporation. Process for producing magnesium utilizing aluminum-silicon alloy reductant. 4,033,758, Cl. 75-67.00R.

Johnston, James D.; Sanders, Robert N.; and Wood, James M., Jr., to Ethyl Corporation. Process for producing magnesium utilizing aluminum metal reductant. 4,033,759, Cl. 75-67.00R.

Johnston, Ronald J., to Aluma Building Systems Incorporated. Wall forming structure for poured concrete walls. 4,033,544, Cl. 249-40.000.

Johnston, Taylor C. Tent apparatus for fumigation of buildings. 4,033,367, Cl. 135-8.000.

Jones, Charles M.: *See—*
Wu, Hai; and Jones, Charles M., 4,033,303, Cl. 123-41.850.

Jones, James H.: *See—*
Cragoe, Edward J., Jr.; and Jones, James H., 4,033,996, Cl. 260-490.000.

Jones, John W.: *See—*
Howley, Frank E.; Jones, John W.; and Logue, Joseph C., 4,034,356, Cl. 340-173.00R.

Jones & Laughlin Steel Corporation: *See—*
Hamburg, Emil G.; Cryderman, Robert L.; and Butler, John F., 4,033,789, Cl. 148-12.00F.

Jones, Norman Stewart, to Pneupac Limited. Lung ventilation equipment. 4,033,343, Cl. 128-145.800.

Jones, Stewart Barry; and Williams, Keith Rushworth, to U.S. Philips Corporation. Microstrip gunn oscillator with varactor tuning. 4,034,313, Cl. 331-96.000.

Jordan, Robert Kenneth. Carboxylation metallation process. 4,034,037, Cl. 260-429.00R.

Josef Bautz GmbH: *See—*
Moosbrucker, Karl, 4,033,628, Cl. 302-34.000.

Joyce, Jack: *See—*
List, Harold A.; Baker, Jack H.; and Joyce, Jack, 4,033,183, Cl. 73-88.50R.

Joyce, Peter Waterworth: *See—*
Thwaites, Peter John; and Joyce, Peter Waterworth, 4,033,251, Cl. 100-95.000.

Jun, Wilhelm Meyer. Invalid wheel-chair. 4,033,624, Cl. 297-434.000.

Junck, John A.: *See—*
Johnson, Howard L.; and Junck, John A., 4,033,236, Cl. 91-463.000.

Junemann, Hubert. Template following mechanism. 4,033,192, Cl. 74-29.000.

Junghanns, Paul; and Burger, Friedhelm, to Wilh. Engstfeld, a Kommanditgesellschaft. Crucible for melting, heat retention and pouring of metals. 4,033,564, Cl. 266-242.000.

Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; and Castillo, Adolfo, to Automated Building Components, Inc. Methods for fabricating wooden frames and the like. 4,033,025, Cl. 29-417.000.

Jurisch, Louis A.: *See—*
Briedis, Juozas; and Jurisch, Louis A., 4,033,976, Cl. 260-299.000.

Jury, Gene R. Furnace and cold air return systems. 4,033,320, Cl. 126-110.00R.

Kabushiki Kaisha Daini Seikosha: *See—*
Matsuura, Eiichi, 4,033,111, Cl. 58-106.500.

Kabushiki Kaisha Komatsu Seisakusho: *See—*
Aoyama, Ryozo; Matsuda, Yukinobu; and Urushima, Mitsuo, 4,033,128, Cl. 60-484.000.
Harazoe, Yoshiaki; Kurakami, Shigeru; Okamoto, Michio; and Hasegawa, Ichiro, 4,034,335, Cl. 340-52.00F.
Sugimoto, Yutaka, 4,033,553, Cl. 254-185.00B.
Sugimoto, Yutaka; and Shiota, Ryoji, 4,033,554, Cl. 254-185.00B.

Kabushiki Kaisha Seikosha: *See—*
Watanabe, Akira; and Harada, Saburo, 4,033,017, Cl. 29-25.350.

Kabushiki Kaisha Suwa Seikosha: *See—*
Hanaoka, Seiji, 4,033,256, Cl. 101-99.000.
Kodaira, Mitsuharu, 4,034,303, Cl. 328-62.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See—*
Sasayama, Chikanobu; Suzuki, Osamu; Shimizu, Takeshi; and Chiba, Kunji, 4,033,107, Cl. 57-81.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Asai, Kiyokazu; and Takeuchi, Akihiro, 4,034,244, Cl. 310-8.200.

Kachik, Robert H.: *See—*
Bieniosek, Chester E.; Kachik, Robert H.; and Pignocco, Arthur J., 4,033,399, Cl. 164-54.000.

Kaczkowski, Zbigniew, to Polska Akademia Nauk, Instytut Fizyki. Magnetostrictive alloy. 4,033,791, Cl. 148-31.550.

Kaeding, Warren W.; and Young, Lewis B., to Mobil Oil Corporation. Selective production of para-xylene. 4,034,053, Cl. 260-672.00T.

Kaiser Glass Fiber Corporation: *See—*
Nichols, Claude R.; and Helberg, Keith A., 4,033,742, Cl. 65-2.000.

Kalinoski, Richard W.: *See—*
Karas, Edwin L.; Annino, Raymond; and Kalinoski, Richard W., 4,033,171, Cl. 73-23.100.

Kalippke, Harald: *See—*
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, 4,033,315, Cl. 123-146.50A.

Kalnberz, Viktor Konstantinovich. Surgical compression-distraction instrument. 4,033,340, Cl. 128-92.00A.

Kaltenbach & Voigt: *See—*
Bareth, Erich; and Loge, Hans, 4,033,040, Cl. 32-27.000.
Lohn, Gerd; and Braun, Anton, 4,033,039, Cl. 32-26.000.

Kamatics Corporation: *See—*
Orkin, Stanley S., 4,033,019, Cl. 29-149.50B.

Kaminaka, Nobuyuki; Kanai, Kenji; Nouchi, Norimoto; and Nomura, Noboru, to Matsushita Electric Industrial Co., Ltd. Magnetic head. 4,034,414, Cl. 360-113.000.

Kamiuchi, Jun-ichi: *See—*
Mitsui, Hisayasu; Kamiuchi, Jun-ichi; Kumazawa, Ryozi; Umemoto, Kimikazu; Yamada, Toshimitsu; Yoshida, Katsuhiko; and Takechi, Taichi, 4,033,805, Cl. 156-185.000.

Kamo, Hisao; Kuroda, Masahiro; and Okano, Susumu, to Tokyo Shibaura Electric Co., Ltd. Schottky semiconductor device. 4,034,394, Cl. 357-15.000.

Kamp, Heinz, to W. Schlafhorst & Co. Method and device for replacing a sliver container. 4,033,104, Cl. 57-34.00R.

Kanai, Kenji: *See—*
Kaminaka, Nobuyuki; Kanai, Kenji; Nouchi, Norimoto; and Nomura, Noboru, 4,034,414, Cl. 360-113.000.

Kanazawa, Tamotsu: *See—*
Hamano, Sachiyuki; Kanazawa, Tamotsu; and Kitamura, Shin-ichi, 4,034,010, Cl. 260-564.00R.

Kanbara, Tohru: *See—*
Uemura, Michihiko; Kanbara, Tohru; and Igarashi, Yutaka, 4,034,317, Cl. 333-30.00R.

Kanbayashi, Tetsusaburo: *See—*
Kobayashi, Toshihiko; Kanbayashi, Tetsusaburo; Ichioka, Satoshi; Takeuchi, Shinjiro; and Matsushima, Yukinori, 4,034,180, Cl. 219-85.0BM.

Kanbe, Takao; Kaneko, Yoshio; and Nomura, Satoshi, to Nisshin Flour Milling Co., Ltd. Method and apparatus for preventing cave-in of baked goods. 4,034,119, Cl. 426-497.000.

Kanebo, Ltd.: *See—*
Sawa, Yoshio, 4,033,966, Cl. 260-286.00Q.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
Suzuki, Kazuo; and Akuta, Shinichiro, 4,034,410, Cl. 360-55.000.

Kaneko, Yoshio: *See—*
Kanbe, Takao; Kaneko, Yoshio; and Nomura, Satoshi, 4,034,119, Cl. 426-497.000.

Kansai Paint Company, Ltd.: *See—*
Isozaki, Osamu; Watanabe, Tadashi; and Sakamoto, Masahiro, 4,033,920, Cl. 260-29.60H.

Kao, Wen-Ling: *See—*
Strike, Donald P.; and Kao, Wen-Ling, 4,034,002, Cl. 260-514.00D.

Kaplan, Murray Arthur; and Granatek, Alphonse Peter, to Bristol-Myers Company. Aqueous suspensions of 7-[D-α-amino-α-(p-hydroxyphenyl)-acetamido]-3-(1,2,3-triazol-5-ylthiomethyl)-3-cephem-4-carboxylic acid 1,2-propylene glycolate. 4,034,089, Cl. 424-246.000.

Kaprelian, Charles Edward. Teaching machine having response dependent programming. 4,033,050, Cl. 35-9.00R.

Karas, Edwin L.; Annino, Raymond; and Kalinoski, Richard W., to Foxboro Company, The. Pneumatic detector for chromatographic analyzer. 4,033,171, Cl. 73-23.100.

Karges, Hermann Erich; Heimburger, Norbert; and Jacobi, Eckart, to Behringwerke Aktiengesellschaft. Process for the determination of plasminogen. 4,033,824, Cl. 195-99.000.

Karl Kroyer St. Anne's Limited: *See—*
Kroyer, Karl Kristian Kobs, 4,033,709, Cl. 425-224.000.

Kartzmark, Roy M., Jr., to United States of America, Navy. Hydrodynamic configuration to be used on underwater launched, unpropelled bodies. 4,033,225, Cl. 89-1.810.

Kasai, Paul Haruo; Francis, James Nelson; and Bishop, Roland Justin, Jr., to Union Carbide Corporation. Preparation of CU+ zeolites. 4,034,065, Cl. 423-328.000.

Kasai, Tsutomu: *See—*
Taninaka, Kuniaki; Kurono, Hitoshi; and Kasai, Tsutomu, 4,034,102, Cl. 424-277.000.

Kasami, Akinobu: *See—*
Naito, Makoto; Kawachi, Masaru; Sekiwa, Tetuo; Akatsuka, Minoru; Kasami, Akinobu; and Toyama, Masaharu, 4,033,291, Cl. 118-412.000.

Kashio, Toshio, to Casio Computer Co., Ltd. Recording device. 4,034,209, Cl. 235-61.90R.

Kashio, Toshio, to Casio Computer Co., Ltd. Memory device with shift register usable as dynamic or static shift register. 4,034,301, Cl. 328-37.000.

Kashio, Toshio, to Casio Computer Co., Ltd. Information-transmitting apparatus. 4,034,350, Cl. 364-900.000.

Kaske, Alan D.: *See—*
Torok, Ernest J.; Kaske, Alan D.; Krawczak, John A.; and Paul, Maynard C., 4,034,359, Cl. 340-174.0TF.

Kasuga, Noboru, to Janome Sewing Machine Co. Sewing machine. 4,033,273, Cl. 112-274.000.

Kato, Shougo: *See—*
Nakamura, Yukio; Kato, Shougo; and Nagaoka, Shinji, 4,033,682, Cl. 352-235.000.

Katz, Irwin A.: *See—*
Hill, John Anthony; Katz, Irwin A.; and Murphy, John H., 4,034,077, Cl. 424-69.000.

Kauffman, David, to Shell Oil Company. Monoethanolamine process for sulfur removal from circulating oil used in sour gas wells. 4,033,410, Cl. 166-244.00C.

Kaufhold, Frederick D.: *See—*
Ericson, Eric A.; and Kaufhold, Frederick D., 4,033,660, Cl. 339-75.00M.

Kaul, Bansi Lal, to Sandoz Ltd. Naphthoquinone derivatives. 4,033,963, Cl. 260-256.40C.

Kawabata, Yasuhiro: *See—*
Inada, Masami; Kawabata, Yasuhiro; and Sato, Katsujiro, 4,033,125, Cl. 60-290.000.

Kawachi, Masaru: *See—*
Naito, Makoto; Kawachi, Masaru; Sekiwa, Tetuo; Akatsuka, Minoru; Kasami, Akinobu; and Toyama, Masaharu, 4,033,291, Cl. 118-412.000.

Kawahara, Yasuhito: *See—*
Ishizaka, Sunao; and Kawahara, Yasuhito, 4,034,392, Cl. 354-289.000.

Kawai, Tsuneo, to Tokyo Shibaura Electric Co., Ltd. Clothes dryer. 4,033,047, Cl. 34-82.000.

Kawamura, Yoshihisa; Saito, Masaaki; and Minami, Hidehiro, to Nissan Motor Co., Ltd. Apparatus for mounting exhaust gas sensor. 4,033,170, Cl. 73-23.000.

Kawasaki Heavy Industries, Ltd.: *See—*
Takagi, Izumi; and Asazuma, Masayuki, 4,033,195, Cl. 74-230.17M.

Kawecki Berylco Industries, Inc.: *See—*
Mockrin, Isadore; and Hobin, Martin A., 4,033,838, Cl. 204-103.000.

Kear, Bernard H.: *See—*
Giamei, Anthony F.; and Kear, Bernard H., 4,033,792, Cl. 148-32.000.

Kedem, Abraham: *See—*
Kedem, Ora; and Kedem, Abraham, 4,033,850, Cl. 204-301.000.

Kedem, Ora; and Kedem, Abraham, to Yeda Research & Development Co. Ltd. Electrodialysis device. 4,033,850, Cl. 204-301.000.

Keedwell, Cyril A., to Pall Corporation. Proportioning valve for volumetric proportioning of flow. 4,033,371, Cl. 137-100.000.

Keil, Jurgen: *See—*
Gruber, Werner; Galinke, Joachim; and Keil, Jurgen, 4,034,145, Cl. 526-328.000.

Keller, Russell D., to Temco Metal Products Company, Inc. Safety connector for pressure tank. 4,033,369, Cl. 137-68.00R.

Kelley, Russell D., to Mead Corporation, The. Production of a color developing record sheet containing metal-modified novolak resin particles. 4,034,128, Cl. 427-150.000.

Kelly, Robert C.; and Nelson, Norman A., to Upjohn Company, The. Analogs of thromboxane B_2 and processes for their synthesis. 4,033,949, Cl. 260-240.00R.

Kelsall, Frederick A., to Rexnord Inc. Self-counterweighted take-up. 4,033,451, Cl. 198-815.000.

Kemmerling, Robert A.: *See—*
Stone, Leonard R.; Aron, Steven J., Jr.; and Kemmerling, Robert A., 4,033,885, Cl. 250-496.000.

Kemper, David C., to Burdette Company, The. Buss barr. 4,033,657, Cl. 339-19.000.

Kemper, James M., to Monogram Industries, Inc. System and method for treating human waste. 4,032,995, Cl. 4-10.000.

Kendale Industries, Inc.: *See—*
Miller, Donald A.; and Setele, William O., 4,033,643, Cl. 308-187.200.

Kennecott Copper Corporation: *See—*
Gerlach, John N., 4,033,765, Cl. 75-108.000.
Harvey, Walter W.; Randlett, Myron R.; and Bangerskis, Karlis I., 4,033,839, Cl. 204-108.000.
Little, Alma M.; and Ralston, Harry R., 4,033,269, Cl. 110-160.000.

Kentfield, John A. C., to Canadian Patents and Development Limited. Thrust augmenting fluid rectifier for a pulsed combustor. 4,033,120, Cl. 60-249.000.

Kerb, Ulrich: *See—*
Nickolson, Robert C.; Kerb, Ulrich; and Wiechert, Rudolf, 4,033,995, Cl. 260-468.500.

Kern, Margaret Jean, to Raymond Lee Organization, Inc., The, a part interest. Sleeping bag. 4,033,001, Cl. 5-343.000.

Kettering Toys, Inc.: *See—*
Marks, Steven L., 4,033,223, Cl. 85-83.000.

Keystone Industries, Inc.: *See—*
Sheesley, Jay R., 4,033,616, Cl. 292-216.000.

Kibby, Robert Milton, to Reynolds Metals Company. Carbothermic reduction process. 4,033,757, Cl. 75-10.00R.

Kikuchi, Masaru: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; Kikuchi, Masaru; and Suzuki, Kazuo, 4,033,024, Cl. 29-403.000.

Kilbourn, Edward E.; and Weiler, Ernest D., to Rohm and Haas Company. 3-Pyridylmethyl-(N-substituted phenyl)-carbamate derivatives. 4,033,972, Cl. 260-294.80D.

Kilguss, Heinz: *See—*
Bethmann, Heinz G.; Kilguss, Heinz; and Simon, Horst, 4,034,391, Cl. 354-289.000.

Kim, Chung Kyu, to Raytheon Company. Method for making avalanche semiconductor amplifier. 4,033,810, Cl. 156-656.000.

Kim, Raymond W. H., to Bell & Howell Company. Forward-reverse multi speed film transport mechanism. 4,033,681, Cl. 352-173.000.

Kindell, Jerry L., to Honeywell Information Systems, Inc. Multiple generating register. 4,034,198, Cl. 235-164.000.

King, Herbert Ray, to Milliken Research Corporation. Circular knitting machine with pivotally mounted access platform. 4,033,147, Cl. 66-8.000.

King, Hewson Nicholas Graham; Mansell, John Revere; and Stubberfield, Pamela May, to U.S. Philips Corporation. Color tube having concentric phosphor ring pattern and electron multiplier channel plate. 4,034,254, Cl. 313-400.000.

King, Joseph H. Arch axle sulky. 4,033,598, Cl. 280-63.000.

King, Leslie George; Lee, Glyn Evan; Martin, George Christopher James; and Jenkins, David Conwil, to May and Baker Limited. Substituted (alkoxycarbonylthioureido)-(acylamino)-benzene derivatives. 4,034,107, Cl. 424-309.000.

King, Thomas M.: *See—*
Mitchell, Robert S.; and King, Thomas M., 4,033,896, Cl. 252-389.00A.

Kiovsky, Thomas E., to Shell Oil Company. Dispersant VI improver. 4,033,888, Cl. 252-56.00D.

Kiovsky, Thomas E., to Shell Oil Company. Terpolymer dispersant - VI improver. 4,033,889, Cl. 252-56.00D.

Kirino, Osamu: *See—*
Hashimoto, Shunichi; and Kirino, Osamu, 4,033,752, Cl. 71-93.000.

Kirk, Norbert A. Body motion bicycle seat brake. 4,033,433, Cl. 188-25.000.

Kirkel, David L., to Seaquist Valve Company. Anti-foaming assembly and method. 4,033,486, Cl. 222-190.000.

Kirrish, Hail; and Provenzano, Albert J., to Textron, Inc. Container fastener system. 4,033,243, Cl. 85-4.000.

Kiselev, Jury Yakovlevich; Merkher, Alexandr Mikhailovich; and Sokolovsky, Stanislav Antonovich. Plasmatron. 4,034,250, Cl. 313-32.000.

Kishi, Hajimu; and Onoda, Fumio, to Oki Electric Industry Company, Ltd. Numerical control system having a symmetrical path generation means. 4,034,192, Cl. 235-151.110.

Kitamura, Shin-ichi: *See—*
Hamano, Sachiyuki; Kanazawa, Tamotsu; and Kitamura, Shin-ichi, 4,034,010, Cl. 260-564.00R.

Kittle, Paul A., to Rohm and Haas Company. Method for forming an inorganic thermal radiation control. 4,034,129, Cl. 427-163.000.

Klauck, David E., to Heath Company. Speaker protection circuit. 4,034,268, Cl. 361-111.000.

Klaus, Harald: *See—*
Kramer, Friedhelm; Wolfertz, Gunter; Klaus, Harald; Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, 4,033,012, Cl. 24-90.00D.

Klee, David J.; and Godtfring, Jack H., to Air Products and Chemicals, Inc. Refrigeration system for shipping container. 4,033,140, Cl. 62-223.000.

Kleimann, Helmut; and von Bonin, Wulf, to Bayer Aktiengesellschaft. Process for molding polyurethane foams. 4,033,912, Cl. 260-2.5AH.

Klein, Schanzlin & Becker Aktiengesellschaft: *See—*
Klepp, Christian; Koll, Gunter; and Matthias, Heinz Bernd, 4,033,877, Cl. 210-304.000.

Kleist, Robert A.; and Matula, Jerry, to Printronix, Inc. Print hammer actuator for dot matrix printers. 4,033,255, Cl. 101-93.040.

Klekar, Virginia M. End fitting for cargo bar. 4,033,268, Cl. 105-497.000.

Klemm, Kurt; and Langenscheid, Erhard, to Byk Gulden Lomberg Chemische Fabrik GmbH. 4(1H)-pyrimidinones. 4,034,093, Cl. 424-251.000.

Klenco Corporation: *See—*
Dugle, Thomas E.; and Webb, Thomas L., 4,033,285, Cl. 118-4.000.

Klenk, Ludwig: *See—*
Strutzel, Hans; Gneuss, Detlef; and Klenk, Ludwig, 4,034,055, Cl. 264-95.000.

Klepak, Philip B.; Richardson, David I.; and Fourman, Robert G., to Johnson & Johnson. Flavored dental articles. 4,033,365, Cl. 132-89.000.

Klepp, Christian; Koll, Gunter; and Matthias, Heinz Bernd, to Klein, Schanzlin & Becker Aktiengesellschaft. Cyclone for removing solid impurities from liquid in a pump and motor unit. 4,033,877, Cl. 210-304.000.

Klett, Stanley D.: *See—*
Charland, Terrence D.; and Klett, Stanley D., 4,033,294, Cl. 118-658.000.

Klingenberg, Gordon U., to Xerox Corporation. Apparatus for developing latent electrostatic images. 4,033,292, Cl. 118-629.000.

Klippan GmbH Hamburg: *See—*
Uwe, Peters; and Minolla, Horst, 4,033,015, Cl. 24-230.0AL.

Klock, Byron V.: *See—*
Bennett, Richard H.; Klock, Byron V.; and Brockington, James W., 4,033,899, Cl. 252-420.000.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See—*
Howe, Hans-Ulrich, 4,033,312, Cl. 123-196.00R.
Jakobs, Willy; and Kryczun, Alfred, 4,033,563, Cl. 266-204.000.

Knapp, Ronald F.: *See—*
Ambrose, Peter C., Jr.; and Knapp, Ronald F., 4,033,501, Cl. 228-2.000.

Knox, Robert M.; and Toulios, Peter P., to Epsilon Lambda Electronics Corporation. Ferrite circulators and isolators and circuits incorporating the same. 4,034,377, Cl. 343-180.000.

Kobayashi, Hitoshi; and Tatemoto, Jirou. Hydroponic cultivation apparatus. 4,033,072, Cl. 47-62.000.

Kobayashi, Toru: *See—*
Morita, Eiichi; Toda, Akira; Kobayashi, Toru; and Fujii, Hiroshi, 4,033,206, Cl. 82-2.00B.

Kobayashi, Toshihiko; Kanbayashi, Tetsusaburo; Ichioka, Satoshi; Takeuchi, Shinjiro; and Matsushima, Yukinori, to Kokusai Denshin Denwa Kabushiki Kaisha; and Mishima Kosan Co., Ltd. Method of continuously soldering small elements arranged generally in a line by a concentrated radiant energy source. 4,034,180, Cl. 219-85.0BM.

Koberstein, Edgar; and Lakatos, Eduard, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Exhaust gas purifying catalyst and process of making and using same. 4,034,060, Cl. 423-213.500.

Koch, Robert: *See—*
Almqvist, Sven-Olof; Enzell, Curt R.; Hjern, Lasse O.; Artho, Antoine; and Koch, Robert, 4,033,362, Cl. 131-264.000.

Kodaira, Mitsuharu, to Kabushiki Kaisha Suwa Seikosha. Electronic pulse generating circuit for eliminating spike pulses. 4,034,303, Cl. 328-62.000.

Kogge, Hans-Jurgen: *See—*
Sorgatz, Ulrich; and Kogge, Hans-Jurgen, 4,033,642, Cl. 308-26.000.

Kohler, Arthur. Multiple passage plastic injection nozzle with heaters. 4,033,485, Cl. 222-146.0HE.

Kokusai Denshin Denwa Kabushiki Kaisha: *See—*
Kobayashi, Toshihiko; Kanbayashi, Tetsusaburo; Ichioka, Satoshi; Takeuchi, Shinjiro; and Matsushima, Yukinori, 4,034,180, Cl. 219-85.0BM.
Nakagome, Yukio; and Fukata, Yasuo, 4,034,404, Cl. 358-142.000.

Koll, Gunter: *See—*
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Komeda, Hiromu: *See—*
Funakoshi, Yoshiro; Matsumura, Yoshihiko; Yamamoto, Masaki; and Komeda, Hiromu, 4,034,126, Cl. 427-8.000.

Kondo, Yutaka: *See—*
Shingu, Iichi; Kondo, Yutaka; and Nishina, Shuho, 4,033,610, Cl. 280-737.000.
Koninklijke Textielfabrieken: *See—*
Jansen, Josephus Johannes Maria, 4,033,151, Cl. 66-147.000.
Konitz, William A.: *See—*
Kuczkowski, John S.; and Konitz, William A., 4,034,097, Cl. 424-263.000.
Konort, Mark D.: *See—*
Lamberti, Vincent; and Konort, Mark D., 4,034,046, Cl. 260-607.00B.
Koppenheffer, Gary Jay; and Rose, William Henry, to AMP Incorporated. Rotary switch housing having integral flexible detenting walls and rotor mounting structure. 4,034,178, Cl. 200-293.000.
Kopytov, Alexandr Maximovich: *See—*
Tayakin, Jury Vasilievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,034,238, Cl. 307-221.00C.
Kori, Seiji: *See—*
Hayashi, Masaki; Kori, Seiji; Miyake, Hajimu; Yamato, Takashi; and Suga, Hisashi, 4,034,003, Cl. 260-514.00D.
Korst, James J.: *See—*
Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., 4,034,040, Cl. 260-570.900.
Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, to Nippon Kokan Kabushiki Kaisha. Method of multiple electrode gas shielded arc welding. 4,034,179, Cl. 219-74.000.
Kotera, Hiroaki: *See—*
Tsuchiya, Hiroyoshi; Tsuda, Yukifumi; Hayami, Heijiro; and Kotera, Hiroaki, 4,034,406, Cl. 358-260.000.
Kotezawa, Katsutaka; Onodera, Toshimi; Hayashi, Setsuo; and Shimanuki, Fujio, to Chiba Communications Industries, Inc. Radio communication system for simultaneous telecommunication between radio stations. 4,034,295, Cl. 325-39.000.
Koto Denki Kabushiki Kaisha: *See—*
Watanabe, Akira; and Harada, Saburo, 4,033,017, Cl. 29-25.350.
Kovacs, Bela V.: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,033,766, Cl. 75-123.0CB.
Kowalski, Gunter, to U.S. Philips Corporation. Device for measuring radiation absorption. 4,034,223, Cl. 250-369.000.
Koyo Seiko Company, Limited: *See—*
Yamada, Tomio, 4,033,645, Cl. 308-207.00A.
Kozuki, Susumu: *See—*
Iwashita, Tomonori; and Kozuki, Susumu, 4,034,388, Cl. 354-173.000.
Ohtaki, Shohei; Kozuki, Susumu; and Nakamura, Zenzo, 4,034,387, Cl. 354-126.000.
Kraemer, Edward Joseph; and Patel, Tulsidas Ramlal, to International Business Machines Corporation. Magnetic disk information storage apparatus. 4,034,411, Cl. 360-98.000.
Kramer, Friedhelm; Wolfertz, Gunter; Klaus, Harald; Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, to Schaeffer-Homberg GmbH. Button, particularly for clothing pieces. 4,033,012, Cl. 24-90.00D.
Krawczak, John A.: *See—*
Torok, Ernest J.; Kaske, Alan D.; Krawczak, John A.; and Paul, Maynard C., 4,034,359, Cl. 340-174.0TF.
Krebs, Jacob, to Shatterproof Glass Corporation. Windowed oven doors. 4,033,321, Cl. 126-198.000.
Krefting, Sherman: *See—*
Baron, Joseph J., Jr.; and Krefting, Sherman, 4,033,922, Cl. 260-29.6RW.
Krekel, Jorg: *See—*
Priemer, Joachim; Schenk, Norbert; Krekel, Jorg; and Schwerdtel, Wulf, 4,033,987, Cl. 260-346.400.
Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-5-pyridylcarbonyloxyimidazolidinones. 4,033,753, Cl. 71-94.000.
Kreuz, Alois; and Hahn, Joachim, to VDO Adolf Schindling AG. Indicating instrument and casing. 4,033,191, Cl. 73-431.000.
Krikorian, Esther; and Sneed, Richard J., to General Dynamics Corporation. Simple method of preparing structurally high quality PbSnTe films. 4,033,843, Cl. 204-192.00P.
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, to Robert Bosch GmbH. Ignition distributor construction for internal combustion engines. 4,033,315, Cl. 123-146.50A.
Krol, Johannes Wilhelmus Antonius: *See—*
Lersmacher, Bernhard; Seifert, Horst; and Krol, Johannes Wilhelmus Antonius, 4,034,031, Cl. 264-25.000.
Kromer, Heiner M.; and Ossman, John, to Haake, Inc. Method of recovery of material test samples. 4,033,557, Cl. 259-192.000.
Kroyer, Karl Kristian Kobs, to Karl Kroyer St. Anne's Limited. Molding apparatus for ribbed product. 4,033,709, Cl. 425-224.000.
Krueger, Bruno O., to Borden, Inc. Removal of oxygen from gas stream with copper catalyst. 4,034,062, Cl. 423-219.000.
Kruger, Bradford E., to International Telephone and Telegraph Corporation. Sequential lobing track-while-scan radar. 4,034,374, Cl. 343-16.00R.
Kruklitis, Karlis, to Burroughs Corporation. Magnetic character recognition system employing a dynamic threshold voltage determination system. 4,034,342, Cl. 340-146.3AG.
Kruppa, Robert W.: *See—*
Love, Robert D.; Cullen, James W.; and Kruppa, Robert W., 4,034,243, Cl. 307-304.000.
Krusche, Erwin: *See—*
Bauer, Wolfgang; Krusche, Erwin; and Ribka, Joachim, 4,033,945, Cl. 260-157.000.
Kryczun, Alfred: *See—*
Jakobs, Willy; and Kryczun, Alfred, 4,033,563, Cl. 266-204.000.
Kuboto Tekko Kabushiki Kaisha: *See—*
Shikiya, Hajime; Nakanishi, Seiichi; Yoshida, Zitsuo; and Hirakawa, Kenkichi, 4,033,197, Cl. 74-331.000.
Kuczkowski, John S.; and Konitz, William A., to Mortell Company. Synergistic biostatic composition. 4,034,097, Cl. 424-263.000.
Kuehl, John. Humane animal trap. 4,033,067, Cl. 43-90.000.
Kugelfischer Georg Schafer & Co.: *See—*
Lang, Franz; and Dees, Erwin, 4,033,646, Cl. 308-218.000.
Kumazawa, Ryozi: *See—*
Mitsui, Hisayasu; Kamiuchi, Jun-ichi; Kumazawa, Ryozi; Umemoto, Kimikazu; Yamada, Toshimitsu; Yoshida, Katsuhiko; and Takechi, Taichi, 4,033,805, Cl. 156-185.000.
Kunioka, Kazuo; Kurihara, Kiwami; Sakasegawa, Koji; Ohsumi, Atushi; Watanabe, Akio; and Sakai, Kenichi, to Nippon Kokan Kabushiki Kaisha. Method of cooling a steel material without deformation. 4,033,737, Cl. 62-64.000.
Kunz, Raymond W.: *See—*
Walter, Henry J.; and Kunz, Raymond W., 4,034,201, Cl. 219-222.000.
Kuo, Han C.; Dotson, Ronald L.; and Woodard, Kenneth E., Jr., to Olin Corporation. Plated metallic cathode. 4,033,837, Cl. 204-98.000.
Kurakami, Shigeru: *See—*
Harazoe, Yoshiaki; Kurakami, Shigeru; Okamoto, Michio; and Hasegawa, Ichiro, 4,034,335, Cl. 340-52.00F.
Kuramochi, Kojiro; and Taga, Yutaka, to Toyota Jidosha Kogyo Kabushiki Kaisha. Governor supporting member and coupling means. 4,033,146, Cl. 64-23.000.
Kuraray Co., Ltd.: *See—*
Shimizu, Akira; Kusano, Manabu; and Takami, Takeshi, 4,033,933, Cl. 260-45.85R.
Kurihara, Kiwami: *See—*
Kunioka, Kazuo; Kurihara, Kiwami; Sakasegawa, Koji; Ohsumi, Atushi; Watanabe, Akio; and Sakai, Kenichi, 4,033,737, Cl. 62-64.000.
Kurland, Heinrich: *See—*
Natt, Peter; and Kurland, Heinrich, 4,033,879, Cl. 210-369.000.
Kuroda, Masahiro: *See—*
Kamo, Hisao; Kuroda, Masahiro; and Okano, Susumu, 4,034,394, Cl. 357-15.000.
Kurono, Hitoshi: *See—*
Taninaka, Kuniaki; Kurono, Hitoshi; and Kasai, Tsutomu, 4,034,102, Cl. 424-277.000.
Kurtz, Abraham Nathan; Thorsteinson, Erlind Magnus; and Decker, Harry Joe, to Union Carbide Corporation. Process for preparing unsaturated acids and aldehydes. 4,034,008, Cl. 260-533.00N.
Kusano, Manabu: *See—*
Shimizu, Akira; Kusano, Manabu; and Takami, Takeshi, 4,033,933, Cl. 260-45.85R.
Kushner, Benjamin: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; and Castillo, Adolfo, 4,033,025, Cl. 29-417.000.
Kushner, Jack; and Zwirblis, Henry G., to Delta Scientific Corporation. Conical liquid metering device. 4,033,482, Cl. 222-136.000.
Kustes, Eduard: *See—*
Ahrweiler, Karl-Heinz; and Leifeld, Ferdinand, 4,033,153, Cl. 68-205.00R.
Kuzarov, Encho Janaki, to Warn Industries, Inc. Winch and method of assembling the same. 4,033,552, Cl. 254-166.000.
La Cellophane: *See—*
Godard, Bernard; and Gomitoli, Roger, 4,033,577, Cl. 271-128.000.
Labadie, Jean Francois: *See—*
Thary, Christian; Bernard, Armand R.; Labadie, Jean Francois; and De La Taille, Olivier P., 4,033,623, Cl. 297-390.000.
Labat, Pierre, to Societe Anonyme de Vehicules Industriels et d'Equipements Mecaniques (SAVIEM). Synchronizer with rocking key disengagement. 4,033,437, Cl. 192-53.00F.
Labofina S.A.: *See—*
De Roocker, Alain J. G., 4,033,887, Cl. 252-49.800.
Laboratoire Belge de l'Industrie Electrique (LABORELEC): *See—*
Lecat, Albert Pierre Marie, 4,034,154, Cl. 174-127.000.
Laboratoire Roger Bellow: *See—*
Pesson, Marcel, 4,034,094, Cl. 424-251.000.
Labyer, Harold S.; and Dodson, James C., to Halliburton Company. Clamp — self aligning. 4,033,701, Cl. 403-13.000.
LaCourte, Robert, to Lawrence Peska Associates, Inc., a part interest. Cuticle instrument. 4,033,363, Cl. 132-73.500.
Ladin, Eli M., to Federal-Mogul Corporation. Self-aligning clutch bearing assembly. 4,033,440, Cl. 192-98.000.
Laithwaite, Eric Roberts, to Vandervell Products Limited. Methods of manufacturing laminated metal strip bearing materials. 4,033,398, Cl. 164-49.000.
Lakatos, Eduard: *See—*
Koberstein, Edgar; and Lakatos, Eduard, 4,034,060, Cl. 423-213.500.
Lake, Norman M. Nasal protective splint. 4,033,342, Cl. 128-140.00N.
Lamb, Gerald P. Terrarium planting implement. 4,033,618, Cl. 294-19.00R.
Lamberti, Vincent; and Konort, Mark D., to Lever Brothers Company. Hydroxyarylalkyl sulfonium halides. 4,034,046, Cl. 260-607.00B.
Lampe, Donald R.; White, Marvin H.; and Mims, James H., to Westing-

house Electric Corporation. Programmable analog transversal filter. 4,034,199, Cl. 235-193.000.

Lance, Richard T.; and Papafingos, Pandelis N., to Alumax Mill Products, Inc. Aluminum dross recovery method. 4,033,760, Cl. 75-68.00R.

Lance, Russell C., Jr.: *See—*
Barnard, Alfred J., Jr.; and Lance, Russell C., Jr., 4,033,897, Cl. 252-408.000.

Landis Tool Company: *See—*
Price, Ralph E., 4,033,076, Cl. 51-105.00R.

Lane, Constance A., to Rohm and Haas Company. Impact and melt strength improvement of poly(alkylene terephthalate). 4,034,013, Cl. 260-835.000.

Lang, Donald D., to Spectra-Strip Corporation. Twisted pair multiconductor ribbon cable with intermittent straight sections. 4,034,148, Cl. 174-34.000.

Lang, Franz; and Dees, Erwin, to Kugelfischer Georg Schafer & Co. Roller bearing with rotatable guide cage. 4,033,646, Cl. 308-218.000.

Lange, K. Robert: *See—*
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Lange, Ronald Albert: *See—*
United States of America, National Aeronautics and Space Administration; Flattau, Theodore; Lange, Ronald Albert; Mellars, John Walter; Peyton, Bernard Joseph; and Wolczok, John Martin, 4,033,882, Cl. 250-199.000.

Langenberger, Peter: *See—*
Fromel, Gerhard; and Langenberger, Peter, 4,033,507, Cl. 239-102.000.

Langenscheid, Erhard: *See—*
Klemm, Kurt; and Langenscheid, Erhard, 4,034,093, Cl. 424-251.000.

Lanier, Gerald N.: *See—*
Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., 4,034,080, Cl. 424-84.000.

Laporte Industries Limited: *See—*
Colegate, Terence Dudley; Farnworth, Christopher Robert; and Davis, Eric Joseph, 4,033,764, Cl. 423-24.000.

Lardon, Marcel A.: *See—*
Williams, David J.; Lardon, Marcel A.; Abkowitz, Martin A.; and Pfister, Gustav, 4,033,769, Cl. 96-1.500.

La Rosa, John, to International Paper Company. Tracheostomy tube. 4,033,353, Cl. 128-351.000.

Larsen, Otis M.; Larsen, Richard D.; Tjernagel, Gerald P.; and Marine, Steven L. Anaerobic system container. 4,033,826, Cl. 195-139.000.

Larsen, Richard D.: *See—*
Larsen, Otis M.; Larsen, Richard D.; Tjernagel, Gerald P.; and Marine, Steven L., 4,033,826, Cl. 195-139.000.

Larson, Dallas J. Rotary internal combustion engine. 4,033,300, Cl. 123-8.450.

Larson, Willis August, to Magic Dot, Inc. Membrane switch apparatus. 4,034,176, Cl. 200-159.00B.

Laughon, Thomas Cecil: *See—*
Chester, Nelson Sherwood; Laughon, Thomas Cecil; and Sindelar, William Frank, 4,033,077, Cl. 51-170.00T.

LaVenture, Orville W., to Burroughs Corporation. System for synchronizing and phase shifting switching regulators. 4,034,232, Cl. 307-32.000.

Law, Harold Bell, to RCA Corporation. Apparatus for forming a color television picture tube screen. 4,034,382, Cl. 354-1.000.

Lawrence Peska Associates, Inc.: *See—*
LaCourte, Robert, 4,033,363, Cl. 132-73.500.

Lawrence, Simone P. Picture frame construction. 4,033,060, Cl. 40-152.100.

Lawrence, Victor Bernard; and Mina, Kent Vincent, to Bell Telephone Laboratories, Incorporated. Digital filter circuit. 4,034,197, Cl. 235-156.000.

Lawson, Leslie Edward, to Vickers Limited. Desensitizing compositions for lithographic platemaking and printing which are aqueous solutions of copolymers of acrylamide with a carboxyl containing monomer and a desensitizing acidic additive. 4,033,919, Cl. 260-29.6TA.

Lawson, Michael B.; and Snyder, Kenneth J., to Halliburton Company. Method for dissolving asphaltic material. 4,033,784, Cl. 134-20.000.

Lazarecky, Vincent. Snow remover. 4,033,055, Cl. 37-16.000.

Lazio, Thomas Joseph: *See—*
Ray, James Allen; and Lazio, Thomas Joseph, 4,033,782, Cl. 106-104.000.

Lebema Eledtriska Aktiebolag: *See—*
Jaffe, Walther, 4,033,057, Cl. 40-21.00R.

Lecat, Albert Pierre Marie, to Laboratoire Belge de l'Industrie Electrique (LABORELEC). Device for reducing the radio and audible noise caused by corona on high voltage electrical installations. 4,034,154, Cl. 174-127.000.

Lee, Glyn Evan: *See—*
King, Leslie George; Lee, Glyn Evan; Martin, George Christopher James; and Jenkins, David Conwil, 4,034,107, Cl. 424-309.000.

Leeds and Micallef: *See—*
Micallef, Lewis A., 4,033,487, Cl. 222-207.000.

Leenhouts, Albert C., to Superior Electric Company, The. Pulse to step error sensing circuit. 4,034,277, Cl. 318-685.000.

le Gressus, Claude; Massignon, Daniel; and Sopizet, Rene, to Commissariat a l'Energie Atomique. Process and apparatus for the elementary and chemical analysis of a sample by spectrum analysis of the energy of the secondary electrons. 4,034,220, Cl. 250-310.000.

Leiber, Heinz, to Teldix GmbH. Anti-lock regulating system. 4,033,637, Cl. 303-115.000.

Leifeld, Ferdinand: *See—*
Ahrweiler, Karl-Heinz; and Leifeld, Ferdinand, 4,033,153, Cl. 68-205.00R.

Lein, Werner; Reichenberger, Kurt; and Schanze, Klaus, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Control system for multi-color rotary printing machines, especially for alternate one-side and two-side printing. 4,033,260, Cl. 101-232.000.

Leitner, Lionel J. Inflatable solar collector for swimming pool. 4,033,326, Cl. 126-271.000.

Leland Stanford Junior University, The Board of Trustees of: *See—*
Miles, Laughton E. M., 4,034,074, Cl. 424-1.000.

Lendt, Hans-Jurgen: *See—*
Muller, Kurt; Lendt, Hans-Jurgen; and Rimmrott, Manfred, 4,034,264, Cl. 361-2.000.

Lengnick, Guenther Fritz, to SWS Silicones Corporation. Cobalt-platinum catalyst. 4,033,902, Cl. 252-441.000.

Leonard, John P.; and Yates, Robert E., to United States of America, Army. Feedback PDM encoder and method for actuating a pneumatic actuator with a digital autopilot. 4,033,525, Cl. 244-3.150.

Lerner, Lewis Brian; and Davis, Thomas Francis, to AMP Incorporated. Tin-nickel plating bath. 4,033,835, Cl. 204-43.00S.

Lerouge, Bernard: *See—*
Bregeon, Louis; Dupuy, Gerard; Lerouge, Bernard; and Schwartz, Jean-Pierre, 4,033,814, Cl. 176-63.000.

Lersmacher, Bernhard; Seifert, Horst; and Krol, Johannes Wilhelmus Antonius, to U.S. Philips Corporation. Method of manufacturing grid electrodes for electron tubes. 4,034,031, Cl. 264-25.000.

Less, Henry R. Weatherproofing device for cameras. 4,033,392, Cl. 150-52.00J.

Lessmann, Gerald G.: *See—*
United States of America, National Aeronautics and Space Administration; Arcella, Frank G.; Lessmann, Gerald G.; and Lindberg, Russell A., 4,033,504, Cl. 228-190.000.

Leung, Steve Ka-Lai: *See—*
Denny, William Michael; Hagen, Russell Louis; and Leung, Steve Ka-Lai, 4,034,353, Cl. 364-200.000.

Leutwyler, Roy: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; Kushner, Benjamin; and Castillo, Adolfo, 4,033,025, Cl. 29-417.000.

Lev, Yaacov; and Pritchard, Frederick R., to Shell Internationale Research Maatschappij B.V. Device for detecting a failure in an insulation system. 4,034,286, Cl. 324-71.00R.

Levenson, Michael K.: *See—*
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May, Carl Jerome, Jr., to Bell Telephone Laboratories, Incorporated. Smooth sequence generator for fractional division purposes. 4,034,302, Cl. 328-39.000.
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Christian, Joseph C.; and Steele, Arthur J., 4,033,711, Cl. 431-66.000.
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Pietsch, Wolfgang B., 4,033,559, Cl. 266-122.000.
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King, Herbert Ray, 4,033,147, Cl. 66-8.000.
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Lampe, Donald R.; White, Marvin H.; and Mims, James H., 4,034,199, Cl. 235-193.000.
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Minnesota Mining and Manufacturing Company: *See—*
Brown, Harvey A., 4,033,948, Cl. 260-240.00A.
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Washio, Takaji; Sasaki, Koichi; and Aizawa, Tatsuo, 4,033,689, Cl. 355-8.000.
Mitchell, Robert S.; and King, Thomas M., to Monsanto Company. Method of corrosion inhibition and compositions therefor. 4,033,896, Cl. 252-389.00A.
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Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.
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Tsujimoto, Michihiro; Tsukahara, Ryoichi; Nishizawa, Tsutomu; and Okubo, Ichiro, 4,033,923, Cl. 260-37.00N.
Mitutoyo Manufacturing Co., Ltd.: *See—*
Shiwaku, Takayuki; and Miyazaki, Takeshi, 4,033,175, Cl. 73-49.200.
Miyake, Hajimu: *See—*
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Mize, Norman W. Fish lure. 4,033,063, Cl. 43-42.050.
Mjos, Shirley A.; and Piasio, Roger N., to Corning Glass Works. Serum hepatitis test. 4,034,072, Cl. 424-1.000.
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Kaeding, Warren W.; and Young, Lewis B., 4,034,053, Cl. 260-672.00T.
Mockrin, Isadore; and Hobin, Martin A., to Kawecki Berylco Industries, Inc. Recovery of copper from waste nitrate liquors by electrolysis. 4,033,838, Cl. 204-103.000.
Moehle, Kenneth Albert; and Taschner, Raymond George, to J. I. Case Company. Dual spring support. 4,033,542, Cl. 248-358.0AA.
Moerk, John C., Jr., to Felt Products Mfg. Co. Assemblies for sealing roadway curb gaps and method of sealing same. 4,033,702, Cl. 404-69.000.
Moertel, George B., to Textron, Inc. Method of making slide fastener coils. 4,034,056, Cl. 264-281.000.
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Alexander, Frank Bernard, Jr.; Capio, Cesar Deduyo; Hauser, Victor Emerald, Jr.; Levinstein, Hyman Joseph; Mogab, Cyril Joseph; Sinha, Ashok Kumar; and Wagner, Richard Siegfried, 4,033,287, Cl. 118-49.10R.
Mohawk Data Sciences Corporation: *See—*
Robinson, Max S.; and Studebaker, Thomas J., 4,033,030, Cl. 29-622.000.
Mole, Cecil J.; and Brenner, William C., to Westinghouse Electric Corporation. Segmented magnet homopolar torque converter. 4,034,248, Cl. 310-178.000.
Moller, George Otto: *See—*
Tobey, Hubert Earl; Hood, John William; Masiuk, Alphonse Michael; Irvin, Dee Lavern; and Moller, George Otto, 4,033,254, Cl. 101-44.000.
Molloy, Bryan B., to Eli Lilly and Company. 1,1-Diphenyl-4-(substituted-amino)butanes. 4,034,011, Cl. 260-570.00R.
Molnar, Albert J.; Rudd, George E.; and Meier, Joseph F., to Westinghouse Electric Corporation. Seal for large annular openings. 4,033,593, Cl. 277-212.00F.
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Kemper, James M., 4,032,995, Cl. 4-10.000.
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Monsan, Pierre: *See—*
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Baldyga, Eugene P., 4,033,804, Cl. 156-84.000.
Hedrick, Ross M.; and Gabbert, James D., 4,034,015, Cl. 260-857.0PG.
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Montedison Fibre S.p.A.: *See—*
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Cassar, Luigi; Foa, Marco; and Gardano, Andrea, 4,034,004, Cl. 260-515.00R.
Montoya, Jose Maria Tarrafeta, to Fabrica Espanola Magnetos, S.A. Electronic control devices applicable to anti-skid equipment in automobile vehicles. 4,033,635, Cl. 303-109.000.
Moody, Roy A.; and Bulanda, John J., to Panduit Corporation. Solderless connector for insulated wires. 4,033,661, Cl. 339-98.000.
Moore, John David; and Wheeler, Ian Robert, to International Synthetic Rubber Company, Limited, The. Graft copolymer preparation. 4,034,020, Cl. 260-880.00R.
Moore, Michael E.: *See—*
Chamberlain, Richard W.; and Moore, Michael E., 4,033,158, Cl. 70-202.000.
Moore, Robert Milton: *See—*
Busanovich, Charles John; and Moore, Robert Milton, 4,034,127, Cl. 427-76.000.
Moore, William Percy, to Slo Release, Inc. Non-burning storable liquid fertilizer. 4,033,745, Cl. 71-28.000.
Moosbrucker, Karl, to Josef Bautz GmbH. Particulate material conveying arrangement. 4,033,628, Cl. 302-34.000.
Moran, Thomas M., to Eaton Corporation. Strain-relief bushing. 4,033,535, Cl. 248-56.000.
Moraw, Roland, to Hoechst Aktiengesellschaft. Process for the production or erasure or deformation images and apparatus for the performance of the process. 4,033,690, Cl. 355-9.000.
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Morcom, Paul J. Fishing tackle box. 4,033,066, Cl. 43-54.50R.
Moreau, Andre, to Electricite de France (Service National). Protection of superheater tubes against corrosion. 4,033,297, Cl. 122-476.000.
Morgan, Donald F.: *See—*
Lindahl, Robert F.; and Morgan, Donald F., 4,033,601, Cl. 280-490.00R.
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Terasawa, Hidenori; and Mori, Ikuo, 4,033,675, Cl. 350-216.000.
Mori, Yoshiro, to Nissan Motor Co., Ltd. Reservoir tank. 4,033,872, Cl. 210-168.000.
Morita, Eiichi; Toda, Akira; Kobayashi, Toru; and Fujii, Hiroshi, to Daihatsu Motor Co., Ltd. Numerically controlled machine tool. 4,033,206, Cl. 82-2.00B.
Morita, Kouichi; Sekine, Hirohito; and Ubukata, Takao, to Sanken Electric Company Limited. Direct current power supply with a transistor chopper. 4,034,281, Cl. 323-17.000.
Morman, James Forrester: *See—*
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Morroni, Pino D., to Pino International Ltd. Quick release device. 4,033,627, Cl. 301-111.000.

Morrow, William K.; and Peterman, Walter B., Jr. Coke oven door seal. 4,033,828, Cl. 202-248.000.

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Mortensen, Thomas L. Method and apparatus for storing biological matter. 4,034,361, Cl. 340-272.000.

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Morton, Scott A., to Hollon, Edmund D., a part interest. Fuel supply systems. 4,033,712, Cl. 431-90.000.

Moser, Hans, to Ciba-Geigy Corporation. N-(1'-alkoxycarbonyl-ethyl)-N-haloacetyl-2,6-dialkylanilines for the control of phytopathogenic fungi. 4,034,108, Cl. 424-309.000.

Moskowitz, Paul M., to Salton, Inc. Grinding apparatus and method. 4,033,516, Cl. 241-30.000.

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Fong, Leong Q., 4,033,555, Cl. 259-4.00R.

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Motoren- und Turbinen-Union Munchen GmbH: *See—*
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Cho, Susumu; Erickson, Paul Milton; and Reynolds, Gary Raymond, 4,034,299, Cl. 325-363.000.
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Rozylowicz, Edward Francis; and Twiselton, Steven Glen, 4,034,289, Cl. 324-95.000.
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Mueller, Otto, Jr., to Massey-Ferguson Inc. Vehicle control system. 4,033,425, Cl. 180-77.00R.

Mukae, Kazuo: *See—*
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Mukai, Kunio: *See—*
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Muller, Alex Marcel; and Tyrrell, Joseph Leslie, to Telautograph Corporation. Electrical sensing writing pen. 4,034,155, Cl. 178-19.000.

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Gilmore, Guy T., 4,033,208, Cl. 82-4.00C.

Multivac Sepp Haggenmueller KG: *See—*
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Hirosawa, Koichiro; Ishikawa, Kazuo; Ogasawara, Tsunchiko; and Murakami, Noboru, 4,033,203, Cl. 74-869.000.

Muranaka, Shigeo: *See—*
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Murata Manufacturing Co., Ltd.: *See—*
Ishiyama, Hideki; Inoue, Atushi; and Ieki, Hidcharu, 4,034,318, Cl. 333-72.000.
Tamada, Minoru; Shikama, Takashi; and Nakamura, Toshikazu, 4,034,207, Cl. 219-517.000.

Murawski, Frank H.; Elliott, James W.; Richards, Fred W.; and Johns, Gordon L., to Medical Scientific International Corporation. System for sensing and recording medical information. 4,033,336, Cl. 128-2.05R.

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Murfin, Donald Leon: *See—*
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Murphy, John H.: *See—*
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Nagano, Toshihiro: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; Kikuchi, Masaru; and Suzuki, Kazuo, 4,033,024, Cl. 29-403.000.

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Nagasawa, Ikuo; and Mukae, Kazuo, to Fuji Electric Company Ltd. Ceramics having nonlinear voltage characteristics and method for producing same. 4,033,906, Cl. 252-519.000.

Nagashima, Wakio: *See—*
Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.

Nagumo, Shin-ichi: *See—*
Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Nagumo, Shin-ichi, 4,033,309, Cl. 123-119.00A.

Naito, Hanichiro; and Yamaguchi, Tsuneo, to Elccompack Company Limited. Electrically-operated shiftable article storage device. 4,033,649, Cl. 312-201.000.

Naito, Keiichi: *See—*
Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, 4,033,840, Cl. 204-159.170.

Naito, Makoto; Kawachi, Masaru; Sekiwa, Tetuo; Akatsuka, Minoru; Kasami, Akinobu; and Toyama, Masaharu, to Tokyo Shibaura Electric Co., Ltd. Apparatus for liquid-phase epitaxial growth. 4,033,291, Cl. 118-412.000.

Nakada, Toshio: *See—*
Isono, Tomoyuki; and Nakada, Toshio, 4,034,341, Cl. 340-146.30H.

Nakagome, Yukio; and Fukata, Yasuo, to Kokusai Denshin Denwa Kabushiki Kaisha. Signal combining system for binary pulse signals. 4,034,404, Cl. 358-142.000.

Nakajima, Yasuo: *See—*
Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,033,308, Cl. 123-119.00A.
Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Nagumo, Shin-ichi, 4,033,309, Cl. 123-119.00A.

Nakamoto, Soichi: *See—*
Tsunekawa, Tokuichi; Nakamoto, Soichi; and Taguchi, Tetsuya, 4,034,384, Cl. 354-33.000.

Nakamura, Katsuhiko: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; Kikuchi, Masaru; and Suzuki, Kazuo, 4,033,024, Cl. 29-403.000.

Nakamura, Shinji: *See—*
Totuka, Kaoru; Ohwaki, Isao; Ohba, Masahiro; and Nakamura, Shinji, 4,033,592, Cl. 274-38.000.

Nakamura, Tetsuro; and Suzuki, Hideaki, to Nippon Electric Company, Ltd. Light sensor having good sensitivity to visible light. 4,034,396, Cl. 357-30.000.

Nakamura, Toshikazu: *See—*
Tamada, Minoru; Shikama, Takashi; and Nakamura, Toshikazu, 4,034,207, Cl. 219-517.000.

Nakamura, Yukio; Kato, Shougo; and Nagaoka, Shinji, to Seiko Koki Kabushiki Kaisha. Exposure quantity control circuit. 4,033,682, Cl. 352-235.000.

Nakamura, Zenzo: *See—*
Ohtaki, Shohei; Kozuki, Susumu; and Nakamura, Zenzo, 4,034,387, Cl. 354-126.000.

Nakanishi, Seiichi: *See—*
Shikiya, Hajime; Nakanishi, Seiichi; Yoshida, Zitsuo; and Hirakawa, Kenkichi, 4,033,197, Cl. 74-331.000.

Nakashima, Akinobu; and Eshima, Masanori. Variable vibrating motor. 4,034,246, Cl. 310-81.000.

National Can Corporation: *See—*
Sauer, Donald G., 4,034,054, Cl. 264-93.000.

National Distillers and Chemical Corporation: *See—*
Stiles, Claude J.; and Tomo, Daniel, 4,033,929, Cl. 264-45.900.

National Semiconductor Corporation: *See—*
Pantiga, Gene N.; and Allen, Robert M., 4,033,844, Cl. 204-224.00R.

National Steel Corporation: *See—*
Loest, Kent W.; and Schaefer, John T., 4,033,842, Cl. 204-180.00P.

National Upper Cervical Chiropractic Research Association, Inc.: *See—*
Gregory, Ralph R.; and Benesh, Peter, 4,033,329, Cl. 128-2.00S.

Natt, Peter; and Kurland, Heinrich, to Braunschweigische Maschinenbauanstalt. Centrifuge, especially sugar centrifuge. 4,033,879, Cl. 210-369.000.

NCR Corporation: *See—*
Horst, William R.; and Hale, William J., 4,034,211, Cl. 235-61.12N.
Thomas, David E.; McCoy, Marion B.; and Chaky, Michael J., 4,034,194, Cl. 235-153.0AC.

Nearn, Malcolm Richard: *See—*
Coulson, James; and Nearn, Malcolm Richard, 4,034,076, Cl. 424-49.000.

Neidorf, Samuel W. Remote liquor dispensing system. 4,033,483, Cl. 222-145.000.

Neill, Jimmie; and Wise, Lester V., to Federal Business Products, Inc. System for producing two-way mailer. 4,033,807, Cl. 156-384.000.

Nelson, Joseph N.: *See—*
Nelson, Richard D., 4,033,733, Cl. 55-274.000.
Nelson, Norman A.: *See—*
Kelly, Robert C.; and Nelson, Norman A., 4,033,949, Cl. 260-240.00R.
Nelson, Richard D., to Nelson, Joseph N. Air filter gauge. 4,033,733, Cl. 55-274.000.
Nevai, Bela B., to Belaco International Ltd. Cleaning and draining device for sink. 4,033,461, Cl. 211-86.000.
New York School of Locksmithing, Inc.: *See—*
Michaels, Bertram, 4,033,044, Cl. 33-189.000.
Newland, Elwood L. Solar energy device. 4,033,126, Cl. 60-398.000.
Newman, Ray; and Affa, Steve, to General Connectors Corporation. Hot air duct. 4,033,381, Cl. 138-113.000.
Newsom, Raymond A.: *See—*
Higgins, Thomas D., Jr.; and Newsom, Raymond A., 4,033,829, Cl. 203-9.000.
Newyear, Raymond Willis: *See—*
Lewis, James Marvin; and Newyear, Raymond Willis, 4,033,773, Cl. 96-115.00P.
Nichols, Claude R.; and Helberg, Keith A., to Kaiser Glass Fiber Corporation. Method for producing glass fibers. 4,033,742, Cl. 65-2.000.
Nichols, Mark R., to United States of America, National Aeronautics and Space Administration. Dual cycle aircraft turbine engine. 4,033,119, Cl. 60-226.00R.
Nichting, Robert P., to Caterpillar Tractor Co. Removable spline between clutch piston and cylinder. 4,033,439, Cl. 192-85.0AA.
Nickell, Louis G., to W. R. Grace & Co. Ripening of sugarcane by use of ammonium isobutyrate. 4,033,755, Cl. 71-113.000.
Nickles, Robert J., to Wisconsin Alumni Research Foundation. Method and apparatus for multiplexing of physiological sensor signals with gamma ray camera data signals. 4,033,335, Cl. 128-2.05R.
Nickolson, Robert C.; Kerb, Ulrich; and Wiechert, Rudolf, to Schering Aktiengesellschaft. D-homo steroids. 4,033,995, Cl. 260-468.500.
Nicolaisen, Holger; Andersen, Finn Schnoor; and Tandrup, Leif Borge, to Danfoss A/S. Timing pulse generating switch. 4,034,327, Cl. 337-41.000.
Nicolas, Yves, to Schlumberger Technology Corporation. Well flow measuring apparatus. 4,033,187, Cl. 73-155.000.
Nicolls, Wilfrid Edward Walter, to C.A.V. Limited. Fuel pumping apparatus with timing correction means. 4,033,310, Cl. 123-139.0AP.
Nienow, John F.; Higgins, Charles T.; and Meyer, Leo F., to Philip Morris Incorporated. Apparatus providing output indication of tobacco rod firmness. 4,033,360, Cl. 131-21.00B.
Nihon Hammond Kabushiki Kaisha: *See—*
Shibahara, Masashi, 4,033,220, Cl. 84-1.030.
Nihon Nohyaku Co. Ltd.: *See—*
Taninaka, Kuniaki; Kurono, Hitoshi; and Kasai, Tsutomu, 4,034,102, Cl. 424-277.000.
Niitsu, Mitsugi: *See—*
Asaka, Urataro; Yamazaki, Shuichi; Niitsu, Mitsugi; and Arai, Sakuji, 4,033,124, Cl. 60-290.000.
Nijs, Marc; Vanassche, Frits; and De Kok, Johannes Arnoldus, to N.V. Bekaert S.A. Method of making a reinforcing strip. 4,033,387, Cl. 140-105.000.
Nikolic, Cvetko B.: *See—*
Clark, Franklin F.; Nikolic, Cvetko B.; and Qucneau, Paul B., 4,034,059, Cl. 423-144.000.
Nilsson, Bruno Yngve, to Boliden Aktiebolag. Method and a device for determining gas generation with electrodes in contact with electrolytes. 4,034,279, Cl. 320-20.000.
Nilsson, Sven Arne. Safety device for butterfly dampers. 4,033,713, Cl. 431-153.000.
Nippon Air Brake Company Ltd.: *See—*
Toi, Toshio, 4,033,233, Cl. 91-374.000.
Nippon Concrete Industries Co. Ltd.: *See—*
Fukushima, Yoshikiyo, 4,033,080, Cl. 52-223.00R.
Nippon Denso Co., Ltd.: *See—*
Arai, Hiroshi, 4,034,336, Cl. 340-52.00F.
Nippon Electric Company, Ltd.: *See—*
Isono, Tomoyuki; and Nakada, Toshio, 4,034,341, Cl. 340-146.30H.
Nakamura, Tetsuro; and Suzuki, Hideaki, 4,034,396, Cl. 357-30.000.
Sato, Yoichi, 4,034,305, Cl. 329-50.000.
Nippon Electric Kagoshima, Limited: *See—*
Yamauchi, Takashi, 4,034,253, Cl. 313-317.000.
Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Deutsch, Ralph, 4,033,219, Cl. 84-1.030.
Tomisawa, Norio; Uchiyama, Yasuji; Okumura, Takatoshi; and Takeda, Toshio, 4,033,221, Cl. 84-1.030.
Nippon Kogaku K.K.: *See—*
Ishizaka, Sunao; and Kawahara, Yasuhito, 4,034,392, Cl. 354-289.000.
Nohda, Masao, 4,033,696, Cl. 356-126.000.
Shimomura, Jun, 4,034,368, Cl. 340-378.00R.
Terasawa, Hidenori; and Mori, Ikuo, 4,033,675, Cl. 350-216.000.
Nippon Kokan Kabushiki Kaisha: *See—*
Arimura, Toru; and Fujita, Fumio, 4,033,165, Cl. 72-205.000.
Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, 4,034,179, Cl. 219-74.000.
Kunioka, Kazuo; Kurihara, Kiwami; Sakasegawa, Koji; Ohsumi, Atushi; Watanabe, Akio; and Sakai, Kenichi, 4,033,737, Cl. 62-64.000.
Nippon Oil Company, Ltd.: *See—*
Ohmori, Tadashi; and Fujisou, Tokuo, 4,033,854, Cl. 208-14.000.
Nippon Soda Company Limited: *See—*
Hosaka, Hideo; and Yoneda, Hiromi, 4,033,750, Cl. 71-90.000.
Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; and Ishikawa, Hisao, 4,033,754, Cl. 71-112.000.
Nippondenso Co., Ltd: *See—*
Arai, Hiroshi; Nogami, Takahiro; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,033,634, Cl. 303-103.000.
Nishina, Shuho: *See—*
Shingu, Iichi; Kondo, Yutaka; and Nishina, Shuho, 4,033,610, Cl. 280-737.000.
Nishio, Minoru: *See—*
Mine, Katsutoshi; Nishio, Minoru; and Sumimura, Shinichi, 4,033,924, Cl. 260-37.0SB.
Nishizawa, Tsutomu: *See—*
Tsujimoto, Michihiro; Tsukahara, Ryoichi; Nishizawa, Tsutomu; and Okubo, Ichiro, 4,033,923, Cl. 260-37.00N.
Nissan Motor Co., Ltd.: *See—*
Endo, Toshiaki; and Hatta, Toshiro, 4,033,011, Cl. 24-73.0FT.
Fujishiro, Takeshi; and Sunano, Naomasa, 4,033,169, Cl. 73-23.000.
Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,033,308, Cl. 123-119.00A.
Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Nagumo, Shin-ichi, 4,033,309, Cl. 123-119.00A.
Kawamura, Yoshihisa; Saito, Masaaki; and Minami, Hidehiro, 4,033,170, Cl. 73-23.000.
Masaki, Kenji; and Minami, Hidehiro, 4,033,122, Cl. 60-274.000.
Masaki, Kenji; and Ookubo, Yoshio, 4,033,123, Cl. 60-286.000.
Mori, Yoshiro, 4,033,872, Cl. 210-168.000.
Sugihara, Kunihiko; Hioki, Kazuo; and Muranaka, Shigeo, 4,033,306, Cl. 123-119.00A.
Nisshin Flour Milling Co., Ltd.: *See—*
Kanbe, Takao; Kaneko, Yoshio; and Nomura, Satoshi, 4,034,119, Cl. 426-497.000.
Nissho-Iwai Co., Ltd.: *See—*
Aoki, Yutaka; Hase, Akira; and Ito, Jiro, 4,033,728, Cl. 44-1.00R.
NL Industries, Inc.: *See—*
Granquist, William T., 4,033,858, Cl. 208-115.000.
Mondshine, Thomas C., 4,033,893, Cl. 252-8.50A.
Nogami, Takahiro: *See—*
Arai, Hiroshi; Nogami, Takahiro; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,033,634, Cl. 303-103.000.
Nohda, Masao, to Nippon Kogaku K.K. Lens meter. 4,033,696, Cl. 356-126.000.
Nolan, John J.; and Marston, Peter G., to Sala Magnetics, Inc. Inlet and outlet apparatus for multiple matrix assembly for magnetic separator and modular matrix and matrix unit. 4,033,864, Cl. 209-223.00R.
Nomura, Noboru: *See—*
Kaminaka, Nobuyuki; Kanai, Kenji; Nouchi, Norimoto; and Nomura, Noboru, 4,034,414, Cl. 360-113.000.
Nomura, Satoshi: *See—*
Kanbe, Takao; Kaneko, Yoshio; and Nomura, Satoshi, 4,034,119, Cl. 426-497.000.
Norman, Virgil Y. Battery terminal connector. 4,033,664, Cl. 339-236.000.
Norris, Frank John, to Raymond Lee Organization, Inc., The. Illuminating insert for a drinking glass. 4,034,213, Cl. 240-6.40G.
North American Philips Corporation: *See—*
Haas, David J., 4,034,251, Cl. 313-59.000.
Northern Electric Company: *See—*
Crowley, George C., 4,034,185, Cl. 219-212.000.
Northrop Corporation: *See—*
Margerum, Donald Lee, 4,034,372, Cl. 343-6.80R.
Nortman, William: *See—*
Hoetger, Robert Arthur; Hagaman, James Albert; and Nortman, William, 4,033,436, Cl. 192-3.300.
Nouchi, Norimoto: *See—*
Kaminaka, Nobuyuki; Kanai, Kenji; Nouchi, Norimoto; and Nomura, Noboru, 4,034,414, Cl. 360-113.000.
Nu-Concept Computer Systems, Inc.: *See—*
Vandermark, Harold F., 4,034,202, Cl. 219-230.000.
Nuclear Power Company (Whetstone) Limited: *See—*
Webber, John William Robert; and Roberts, Anthony Charles, 4,033,815, Cl. 176-87.000.
Nussbaum, Ralph W.: *See—*
Curtis, Omer E., Jr.; Tuller, Harold W.; O'Neill, Charles T.; and Nussbaum, Ralph W., 4,034,014, Cl. 260-837.00R.
Nutter, Norman E.; and Hoffman, Herbert N., to General Electric Company. Throttle valve operator. 4,033,234, Cl. 91-384.000.
N.V. Bekaert S.A.: *See—*
Nijs, Marc; Vanassche, Frits; and De Kok, Johannes Arnoldus, 4,033,387, Cl. 140-105.000.
Nyberg, Ole: *See—*
Andorsen, John Peter; Revhaug, Helge; and Nyberg, Ole, 4,033,596, Cl. 280-11.200.
O'Brien, John F., to Mercy Hospital and Mercy Orphan Asylum of Chicago, The. Book desk. 4,033,652, Cl. 312-245.000.
O'Connell, Richard P., to Xerox Corporation. Multi-mode reproducing machine. 4,033,692, Cl. 355-14.000.

Odashima, Tooru: *See—*
Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, 4,033,840, Cl. 204-159.170.

Oddicini, Giuseppe, to Ing. C. Olivetti & C., S.p.A. Ribbon feed device for office machines. 4,033,445, Cl. 197-151.000.

Oeser, Konrad, to Metzeler Gummitechnik GmbH. Method for destructionless proofing of viscoelastic products. 4,033,181, Cl. 73-88.00A.

Ogasahara, Tsunehiko: *See—*
Murakami, Noboru; and Ogasahara, Tsunehiko, 4,033,368, Cl. 137-54.000.

Ogasawara, Tsunehiko: *See—*
Hirosawa, Koichiro; Ishikawa, Kazuo; Ogasawara, Tsunehiko; and Murakami, Noboru, 4,033,203, Cl. 74-869.000.

Ogata, Yoshio: *See—*
Gunjigake, Koreaki; Hasegawa, Masashi; Oizumi, Hiroshi; and Ogata, Yoshio, 4,033,790, Cl. 148-22.000.

Ogawa, Youji: *See—*
Sano, Shunichi; and Ogawa, Youji, 4,034,324, Cl. 335-212.000.

O'Grady, Thomas Raymond. Spring type ball pitching device. 4,033,318, Cl. 124-7.000.

Ohba, Masahiro: *See—*
Totuka, Kaoru; Ohwaki, Isao; Ohba, Masahiro; and Nakamura, Shinji, 4,033,592, Cl. 274-38.000.

Ohloff, Gunther: *See—*
Sundt, Erling; and Ohloff, Gunther, 4,034,044, Cl. 260-586.00R.

Ohm, Edward Allen, to Bell Telephone Laboratories, Incorporated. Antenna with echo cancelling elements. 4,034,378, Cl. 343-781.0CA.

Ohmori, Hitoshi; and Horie, Kiyoshi, to Rank Xerox Ltd. Developing device of an electrophotographic copying machine. 4,033,293, Cl. 118-653.000.

Ohmori, Tadashi; and Fujisou, Tokuo, to Nippon Oil Company, Ltd. Electrical insulating oils. 4,033,854, Cl. 208-14.000.

Ohorodnik, Alexander: *See—*
Bollert, Ulrich; Lohmar, Elmar; and Ohorodnik, Alexander, 4,033,936, Cl. 260-75.00P.

Ohsumi, Atushi: *See—*
Kunioka, Kazuo; Kurihara, Kiwami; Sakasegawa, Koji; Ohsumi, Atushi; Watanabe, Akio; and Sakai, Kenichi, 4,033,737, Cl. 62-64.000.

Ohtaki, Shohei; Kozuki, Susumu; and Nakamura, Zenzo, to Canon Kabushiki Kaisha. Apparatus for taking photographs of an object in close proximity by means of flash. 4,034,387, Cl. 354-126.000.

Ohtani, Toshiyuki: *See—*
Sakamaki, Hisashi; and Ohtani, Toshiyuki, 4,034,189, Cl. 219-216.000.

Ohwaki, Isao: *See—*
Totuka, Kaoru; Ohwaki, Isao; Ohba, Masahiro; and Nakamura, Shinji, 4,033,592, Cl. 274-38.000.

Oizumi, Hiroshi: *See—*
Gunjigake, Koreaki; Hasegawa, Masashi; Oizumi, Hiroshi; and Ogata, Yoshio, 4,033,790, Cl. 148-22.000.

Okamoto, Atutoshi: *See—*
Arai, Hiroshi; Nogami, Takahiro; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,033,634, Cl. 303-103.000.

Okamoto, Michio: *See—*
Harazoe, Yoshiaki; Kurakami, Shigeru; Okamoto, Michio; and Hasegawa, Ichiro, 4,034,335, Cl. 340-52.00F.

Okano, Susumu: *See—*
Kamo, Hisao; Kuroda, Masahiro; and Okano, Susumu, 4,034,394, Cl. 357-15.000.

Oki Electric Industry Company, Ltd.: *See—*
Homma, Rokuro, 4,034,323, Cl. 335-129.000.
Kishi, Hajimu; and Onoda, Fumio, 4,034,192, Cl. 235-151.110.

Okubo, Ichiro: *See—*
Tsujimoto, Michihiro; Tsukahara, Ryoichi; Nishizawa, Tsutomu; and Okubo, Ichiro, 4,033,923, Cl. 260-37.00N.

Okumura, Takatoshi: *See—*
Tomisawa, Norio; Uchiyama, Yasuji; Okumura, Takatoshi; and Takeda, Toshio, 4,033,221, Cl. 84-1.030.

Olin Corporation: *See—*
Baker, Joseph E., 4,033,847, Cl. 204-250.000.
Kuo, Han C.; Dotson, Ronald L.; and Woodard, Kenneth E., Jr., 4,033,837, Cl. 204-98.000.
Wojtowicz, John A.; and Gavin, David F., 4,034,070, Cl. 423-489.000.

Oliver, Willie R. Horse race board game apparatus. 4,033,587, Cl. 273-134.0CH.

Ollis, George E., to United States Steel Corporation. Method of making an electric cable. 4,033,800, Cl. 156-48.000.

Olson, Richard O.: *See—*
Pohto, Gerald R.; and Olson, Richard O., 4,033,849, Cl. 204-286.000.

Olsson, David L., to TRW Inc. Coupled bar microwave bandpass filter. 4,034,319, Cl. 333-73.00R.

Omietanski, George M.; Furbee, Harold D.; and Chuang, Vincent T., to Union Carbide Corporation. Hydroxybicyclosiloxane rigid urethane foam stabilizers. 4,033,990, Cl. 260-448.20B.

O'Neill, Charles T.: *See—*
Curtis, Omer E., Jr.; Tuller, Harold W.; O'Neill, Charles T.; and Nussbaum, Ralph W., 4,034,014, Cl. 260-837.00R.

Ono Pharmaceutical Co., Ltd.: *See—*
Hayashi, Masaki; Kori, Seiji; Miyake, Hajimu; Yamato, Takashi; and Suga, Hisashi, 4,034,003, Cl. 260-514.00D.

Onoda, Fumio: *See—*
Kishi, Hajimu; and Onoda, Fumio, 4,034,192, Cl. 235-151.110.

Onoda, Takeru; and Wada, Keisuke, to Mitsubishi Chemical Industries Ltd. Process for preparing a carboxylic ester. 4,033,999, Cl. 260-488.0CD.

Onodera, Toshimi: *See—*
Kotezawa, Katsutaka; Onodera, Toshimi; Hayashi, Setsuo; and Shimanuki, Fujio, 4,034,295, Cl. 325-39.000.

Onsrud, Rudolph F. Profile cutting machine. 4,033,230, Cl. 90-13.400.

Ontario Research Foundation: *See—*
Besik, Ferdinand, 4,033,875, Cl. 210-197.000.

Ookubo, Yoshio: *See—*
Masaki, Kenji; and Ookubo, Yoshio, 4,033,123, Cl. 60-286.000.

Orkin, Stanley S., to Kamatics Corporation. Method of assembling bearings. 4,033,019, Cl. 29-149.50B.

Ormiston, Robert M.: *See—*
Jacobson, Robert L.; and Ormiston, Robert M., 4,033,898, Cl. 252-416.000.

Ornsteen Chemicals, Inc.: *See—*
Ornsteen, Robert L., 4,033,484, Cl. 222-146.0HE.

Ornsteen, Robert L., to Ornsteen Chemicals, Inc. Hot melt cartridge adhesive gun. 4,033,484, Cl. 222-146.0HE.

Oros, Richard G., to C&O Railroad Company; and B&O Railroad Company. A.C. hydroelectrostatic precipitator. 4,033,851, Cl. 204-302.000.

Orthman, Henry K., to Orthman Manufacturing, Inc. Blade means for row crop thinning machine. 4,033,416, Cl. 172-61.000.

Orthman Manufacturing, Inc.: *See—*
Orthman, Henry K., 4,033,416, Cl. 172-61.000.

Orthmann, Jurgen, to AGFA-Gevaert, Aktiengesellschaft. Color copying apparatus. 4,033,688, Cl. 355-4.000.

Orwoll, Edward Francis: *See—*
Hardy, Donald, Sr.; and Orwoll, Edward Francis, 4,034,023, Cl. 260-973.000.

Osada, Chiaki: *See—*
Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.

Osawa, Sadao: *See—*
Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.

Osceola Clutch & Brake Company: *See—*
Lunde, James M.; and Schwartz, John G., Jr., 4,033,038, Cl. 30-382.000.

Ossman, John: *See—*
Kromer, Heiner M.; and Ossman, John, 4,033,557, Cl. 259-192.000.

Osswald, Dieter: *See—*
Sader, George; and Osswald, Dieter, 4,033,695, Cl. 355-87.000.

Ostrofsky, Bernard: *See—*
Eberle, Frederick L.; and Ostrofsky, Bernard, 4,033,176, Cl. 73-67.900.

Ota, Jun: *See—*
Tanigawa, Kou; Hashikawa, Kenzo; and Ota, Jun, 4,034,369, Cl. 340-52.00F.

Ottersbach, Thomas V.: *See—*
Crow, William D.; Ottersbach, Thomas V.; and Hildebrandt, Eugene F., 4,034,173, Cl. 200-80.00R.

Owen, David Gregory; Ashworth, John Vernon; and Radcliffe, Paul Anthony Beaufort, to International Publishing Corporation Ltd. Apparatus for reproducing graphic material. 4,034,400, Cl. 358-75.000.

Owen, Geoffrey Robert: *See—*
Durant, Graham John; Ganellin, Charon Robin; and Owen, Geoffrey Robert, 4,034,101, Cl. 424-273.000.

Owens-Illinois, Inc.: *See—*
Heier, Robert J., 4,033,447, Cl. 198-441.000.
Pei, Yu K., 4,033,327, Cl. 126-271.000.
Rhoads, Roger R., 4,034,131, Cl. 428-35.000.
Young, Chung Chang, 4,033,777, Cl. 106-52.000.

P/A Industries, Inc.: *See—*
Taylor, Herbert E.; and Evans, Frederick P., 4,033,289, Cl. 118-227.000.

Pacific Technology: *See—*
Leyde, Warren L., 4,034,233, Cl. 307-41.000.

Packard, James R., to Minnesota Mining and Manufacturing Company. Adhesive-free process for bonding a semiconductor crystal to an electrically insulating, thermally conductive stratum. 4,034,181, Cl. 219-121.0EM.

Paddock of California, Inc.: *See—*
Wall, Frederick, 4,033,871, Cl. 210-96.00R.

Paddock, Paul F.; and Cramer, Jerry W., to Sunkist Growers, Inc. Conveyor with removable receptacles. 4,033,450, Cl. 198-648.000.

Page, David: *See—*
Lorch, Edgar Adolf; Fletcher, Keith Ernest; and Page, David, 4,033,884, Cl. 250-496.000.

Palazzetti, Mario; and Grisotto, Franco, to Fiat Societa per Azioni. Electrical distribution systems for motor vehicles. 4,034,271, Cl. 361-332.000.

Pall Corporation: *See—*
Keedwell, Cyril A., 4,033,371, Cl. 137-100.000.
Pall, David B., 4,033,881, Cl. 210-491.000.

Pall, David B., to Pall Corporation. Multilayer paper sheet filter cartridges. 4,033,881, Cl. 210-491.000.

Palleroni, Norberto: *See—*
Liu, Chao-Min; Palleroni, Norberto; Hermann, Theron; and Prosser, Barbara, 4,033,823, Cl. 195-80.00R.

Panasik, Theodore: *See—*
Sprung, Joseph A.; Panasik, Theodore; and Holmes, James J., 4,033,772, Cl. 96-114.000.

Panduit Corporation: *See—*
Moody, Roy A.; and Bulanda, John J., 4,033,661, Cl. 339-98.000.

Pannier, Karl A., Jr.: *See—*
Sorenson, James L.; Pannier, Karl A., Jr.; and Reynolds, Gordon S., 4,033,345, Cl. 128-214.00R.

Pantiga, Gene N.; and Allen, Robert M., to National Semiconductor Corporation. Apparatus for selectively plating lead frames. 4,033,844, Cl. 204-224.00R.

Papa, Anthony Joseph, to Union Carbide Corporation. Stable phenolic resoles. 4,033,909, Cl. 260-2.50F.

Papa, Anthony Joseph, to Union Carbide Corporation. Methyl formate as an adjuvant in phenolic foam formation. 4,033,910, Cl. 260-2.50F.

Papafingos, Pandelis N.: *See—*
Lance, Richard T.; and Papafingos, Pandelis N., 4,033,760, Cl. 75-68.00R.

Paper Converting Machine Company: *See—*
Spencer, Harvey J., 4,033,862, Cl. 209-73.000.

Paris, Irwin S. Elastic type exercising. 4,033,580, Cl. 272-137.000.

Parker-Hannifin Corporation: *See—*
Currie, William E.; Gunning, David W.; and Russell, John G., 4,033,022, Cl. 29-237.000.

Parquet, Donald James; and Pedersen, Carl Oluf, to J. I. Case Company. Dual oil filter automatic switching system. 4,033,870, Cl. 210-90.000.

Parsons, Roger R., to Raven Industries, Inc. Deflation cap for pressurized hot air airship. 4,033,527, Cl. 244-99.000.

Partridge, Peter George: *See—*
Bickerdike, Robert Lewis; Clark, Douglas; Eastabrook, John Norman; Hughes, Garyth; Mair, William Norman; Partridge, Peter George; and Ranson, Harry Christopher, 4,033,793, Cl. 148-32.000.

Pashley, Richard D., to Intel Corporation. High density/high speed MOS process and device. 4,033,026, Cl. 29-571.000.

Pasquini, Zeno: *See—*
Bargain, Michel; and Pasquini, Zeno, 4,033,731, Cl. 55-16.000.

Passmore, Michael Edward Anthony. Rigid structure. 4,034,135, Cl. 428-184.000.

Pasturczak, Vincent S., to Bell & Howell Company. Rapid film rewind mechanism. 4,033,680, Cl. 352-124.000.

Pataki, William V., to Aluminum Company of America. Merging or blending techniques for small parts. 4,033,441, Cl. 193-38.000.

Patchett, Arthur A.: *See—*
ten Brocke, Jan; Grabowski, Edward J. J.; Flataker, Lars M.; Fisher, Michael H.; and Patchett, Arthur A., 4,033,968, Cl. 260-288.0CF.

Patel, Tulsidas Ramlal: *See—*
Kraemer, Edward Joseph; and Patel, Tulsidas Ramlal, 4,034,411, Cl. 360-98.000.

Patterson, Bernard A. Non-fat dried whipping composition. 4,034,122, Cl. 426-570.000.

Paul, Maynard C.: *See—*
Torok, Ernest J.; Kaske, Alan D.; Krawczak, John A.; and Paul, Maynard C., 4,034,359, Cl. 340-174.0TF.

Pauliukonis, Richard S. Compressed gas valve with constant flow. 4,033,378, Cl. 137-614.190.

Paxton, Charles F., to Weltronic Company. Welding and automation control system. 4,034,212, Cl. 235-151.100.

Payrhammer, Bernd; Bartel, Siegfried; and Besigk, Geert, to AGFA-Gevaert, Aktiengesellschaft. Light interrupter. 4,033,693, Cl. 355-71.000.

Peacock, John W.: *See—*
Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., 4,034,080, Cl. 424-84.000.

Pearce, Glenn T.: *See—*
Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., 4,034,080, Cl. 424-84.000.

Pearl, David Raymond, to Gerber Garment Technology, Inc. Blade sharpener. 4,033,214, Cl. 83-174.000.

Peddinghaus, Rolf: *See—*
Wepner, Joachim, 4,033,571, Cl. 269-315.000.

Pedersen, Carl Oluf: *See—*
Parquet, Donald James; and Pedersen, Carl Oluf, 4,033,870, Cl. 210-90.000.

Peek, Johannes Bernhard Heinrich: *See—*
Butterweck, Hans-Jurgen; Claasen, Theodoor Antonius Carel Maria; Mecklenbrauker, Wolfgang Friedrich Georg; and Peek, Johannes Bernhard Heinrich, 4,034,196, Cl. 235-156.000.

Peel, Mervyn Evan: *See—*
Bays, David Edmund; Peel, Mervyn Evan; Waters, David Martin; and Ellis, Gwynn Pennant, 4,034,075, Cl. 424-45.000.

Pei, Yu K., to Owens-Illinois, Inc. Solar energy collector module system. 4,033,327, Cl. 126-271.000.

Peil, William: *See—*
McFadyen, Robert J.; and Peil, William, 4,034,298, Cl. 325-318.000.

Pellegrino, Anthony, to Machlett Laboratories, Incorporated, The. Compensated voltage divider. 4,034,283, Cl. 323-74.000.

Penick & Ford, Limited: *See—*
Brouillard, Robert Ernest, 4,033,820, Cl. 195-31.00R.

Pennington, James R., to Allied Chemical Corporation. Vibrator and pushing apparatus for driving metal pins in rock faces in mines. 4,033,419, Cl. 173-34.000.

Pennwalt Corporation, S.S. White Dental Products Division: *See—*
Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A., 4,034,225, Cl. 250-471.000.

Penrod, Glen H., to Gould Inc. Range top element. 4,034,206, Cl. 219-464.000.

Pensa, Ildo Emil; and Rau, Robert Otto, to J. P. Stevens & Co., Inc. Controlling degree of reaction by controlling heat input in cellulose textile-reactant systems. 4,032,992, Cl. 2-243.00R.

Peplow, Marvin J.; and Wells, Peter M., Jr., to Ideal Industries, Inc. Hand-held wall receptacle wiring tester with oppositely disposed push/pull surfaces for insertion and removal of the tester. 4,034,284, Cl. 324-51.000.

Perciaccante, Vincent Anthony: *See—*
Augurt, Thomas Anthony; Rosensaft, Michael Norman; and Perciaccante, Vincent Anthony, 4,033,938, Cl. 260-78.30R.

Perkins, Fred M., Jr. Modular building system. 4,033,081, Cl. 52-263.000.

Personal Communications, Inc.: *See—*
Waly, Adnan, 4,033,686, Cl. 353-120.000.

Personal Products Company: *See—*
Siragusa, Judith Ann, 4,034,084, Cl. 424-180.000.

Pesson, Marcel, to Laboratoire Roger Bellow. 8-Alkyl-5-oxo-5,8-dihydro-pyrido(2,3-d)pyrimidine-6-carboxylic acids for treating urinary tract infections. 4,034,094, Cl. 424-251.000.

Peterman, Walter B., Jr.: *See—*
Morrow, William K.; and Peterman, Walter B., Jr., 4,033,828, Cl. 202-248.000.

Petersen, Niel R., to MTS Systems Corporation. Pneumatic linear spring device. 4,033,566, Cl. 267-126.000.

Peterson, John Elwood. Flexible magnetic plastic strip closure. 4,033,013, Cl. 24-201.00B.

Petit, Michel. Riding saddle. 4,033,097, Cl. 54-44.000.

Petro-Tex Chemical Corporation: *See—*
Lovelace, Billy J., 4,034,049, Cl. 260-658.00R.

Pettibone Corporation: *See—*
Brown, Wilburn Kelly, 4,033,468, Cl. 214-130.00R.

Petzetakis, Aristovoulos George. Apparatus for the production of hollow bodies, especially large-diameter ducts from thermoplastic synthetic resin. 4,033,808, Cl. 156-425.000.

Peuterbaugh, Bruce G., to J. P. Tool, Inc. Generating head structure. 4,033,207, Cl. 82-2.00E.

Peyton, Bernard Joseph: *See—*
United States of America, National Aeronautics and Space Administration; Flattau, Theodore; Lange, Ronald Albert; Mellars, John Walter; Peyton, Bernard Joseph; and Wolczok, John Martin, 4,033,882, Cl. 250-199.000.

Pfister, Gustav: *See—*
Williams, David J.; Lardon, Marcel A.; Abkowitz, Martin A.; and Pfister, Gustav, 4,033,769, Cl. 96-1.500.

Pfizer Inc.: *See—*
Cronin, Timothy H.; Faubl, Hermann; Hoffman, William W.; and Korst, James J., 4,034,040, Cl. 260-570.900.

Pfoutz, Ray W.; Mauritz, Karl H.; and Skurla, John P., to Reticon Corporation. Automatic exposure control for a luminous object monitor system. 4,033,697, Cl. 356-160.000.

Philibert, Robert A., to General Signal Corporation. Process for forming intermediate metal conduit. 4,033,167, Cl. 72-367.000.

Philip Morris Incorporated: *See—*
Nienow, John F.; Higgins, Charles T.; and Meyer, Leo F., 4,033,360, Cl. 131-21.00B.

Philipp, Adolf H.; and Humber, Leslie G., to American Home Products Corporation. 4H-pyrano[4,3-d]thiazole derivatives and process therefor. 4,033,977, Cl. 260-302.00F.

Phillips, Allan J. Minnow moocher. 4,033,064, Cl. 43-42.390.

Phillips, Ian Ross; and Reynolds, Mervyn Frank, to N. J. Phillips Pty. Limited. Adjustment device for drench guns or syringes. 4,033,346, Cl. 128-223.000.

Phillips Petroleum Company: *See—*
Bates, Danny E., 4,034,195, Cl. 235-153.0AC.
Vautrain, Lucien H., 4,033,727, Cl. 23-288.00R.

Phripp, Clarence F.; and Preston, Norman R. Flush toilet accessory. 4,032,997, Cl. 4-52.000.

Piasio, Roger N.: *See—*
Mjos, Shirley A.; and Piasio, Roger N., 4,034,072, Cl. 424-1.000.

Pic, Francoise. Apparatus for distributing playing cards automatically. 4,033,590, Cl. 273-149.00R.

Pichl, Heinz. Housing for outboard motors. 4,033,282, Cl. 115-17.000.

Pickard, James Bruce: *See—*
Heckman, LeRoy Francis, Jr.; and Pickard, James Bruce, 4,034,320, Cl. 333-82.00B.

Pierson, Gerald L.: *See—*
Hetzler, Robert B.; and Pierson, Gerald L., 4,033,129, Cl. 60-486.000.

Pietsch, Wolfgang B., to Midrex Corporation. Apparatus for continuous passivation of sponge iron material. 4,033,559, Cl. 266-122.000.

Pignocco, Arthur J.: *See—*
Bieniosek, Chester E.; Kachik, Robert H.; and Pignocco, Arthur J., 4,033,399, Cl. 164-54.000.

Pinkalla, Hamilton A.: *See—*
Johnson, Paul A.; and Pinkalla, Hamilton A., 4,033,774, Cl. 106-35.000.

Pinkstaff, Carlos Dean, to Babcock & Wilcox Company, The. Pneumatic buffering system. 4,033,250, Cl. 100-53.000.
Pino International Ltd.: *See—*
Morroni, Pino D., 4,033,627, Cl. 301-111.000.
Piontkowski, Carl, to C & D. Distributors, Inc. Wood splitter. 4,033,390, Cl. 144-193.00D.
Piotrowski, Herbert: *See—*
Bunge, Ernst; Rothgordt, Ulf; Ehlers, Bernd; and Piotrowski, Herbert, 4,033,443, Cl. 197-1.00R.
Piper, Ortwin: *See—*
Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, 4,033,006, Cl. 14-75.000.
Pitney-Bowes, Inc.: *See—*
Mandulcy, Flavio M.; and Dlugos, Daniel F., 4,034,287, Cl. 324-73.00R.
Pittner, Heribert: *See—*
Zolss, Gerhard; Pittner, Heribert; and Stormann-Menninger-Lerchenthal, Heimo, 4,034,009, Cl. 260-553.00A.
Planet-Wattohm: *See—*
Thomasset, Andre Alphonse, 4,033,396, Cl. 160-332.000.
Platt, Stephen A., to Platt, Stephen A.; and Platt, Vernet B. Tape drive apparatus. 4,033,495, Cl. 226-186.000.
Platt, Vernet B.: *See—*
Platt, Stephen A., 4,033,495, Cl. 226-186.000.
Plattner, Werner, administrator: *See—*
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,033,967, Cl. 260-287.0CF.
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,034,096, Cl. 424-258.000.
Plempel, Manfred: *See—*
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 4,033,964, Cl. 260-268.00C.
Plessey Handel und Investments A.G.: *See—*
Hollis, John Edward, 4,034,166, Cl. 179-170.0NC.
Ploger, Walter; Schmidt-Dunker, Manfred; and Gloxhuber, Christian, to Henkel & Cie G.m.b.H. Pyrrolidone-5,5-diphosphonic acids. 4,034,086, Cl. 424-200.000.
Pneupac Limited: *See—*
Jones, Norman Stewart, 4,033,343, Cl. 128-145.800.
Pohto, Gerald R.; and Olson, Richard O., to Diamond Shamrock Corporation. Electrode and apparatus for forming the same. 4,033,849, Cl. 204-286.000.
Polaroid Corporation: *See—*
Gold, Nicholas, 4,034,386, Cl. 354-86.000.
Politechnika Krakowska: *See—*
Jarnuszkiewicz, Stanislaw, 4,033,302, Cl. 123-59.0BM.
Polska Akademia Nauk, Instytut Fizyki: *See—*
Kaczkowski, Zbigniew, 4,033,791, Cl. 148-31.550.
Polva-Nederland B.V.: *See—*
Acda, Petrus Marinus, 4,034,057, Cl. 264-297.000.
Polyakov, Anatoly Mikhailovich: *See—*
Dmitricv, Vasily Petrovich; Polyakov, Anatoly Mikhailovich; Tomilin, Alexandr Grigoricvich; and Shushpan, Stanislav Mikhailovich, 4,033,116, Cl. 60-39.28R.
Polygulf Associates: *See—*
Horowitz, Carl; and Dichter, Michael, 4,033,852, Cl. 208-8.000.
Pont-A-Mousson S.A.: *See—*
Bram, Georges Eugene, 4,033,613, Cl. 285-184.000.
Ponzellini, Giulio, to Anonima Castelli S.p.A. Device for adjusting the height of the seat of arm-chairs and the like. 4,033,543, Cl. 248-412.000.
Poseidom Marketing and Development Co.: *See—*
Lundh, Roy W., 4,033,281, Cl. 114-295.000.
Post Office, The: *See—*
Rolfe, Hugh Hieron, 4,033,496, Cl. 226-188.000.
Potier, Pierre: *See—*
Sevenet, Thierry; Thal, Claude; Potier, Pierre; and Husson, Henri Philippe, 4,033,969, Cl. 260-293.530.
Potoski, John R.: *See—*
Freed, Meier E.; and Potoski, John R., 4,034,041, Cl. 260-571.000.
Pourat nee Gaillard, Aimee: *See—*
Pourrat, Henri; and Pourat nee Gaillard, Aimee, 4,033,818, Cl. 195-7.000.
Pourrat, Henri; and Pourat nee Gaillard, Aimee, to Centre Europeen de Recherches Mauvernay C.E.R.M. Process for the preparation of a complete extract of pilewort roots. 4,033,818, Cl. 195-7.000.
Powell, James E., to Shell Oil Company. 3,4-Dihydro-8-nitro-2H-pyrrolo(2,1-B)(1,3)thiazin-7(6H)-one. 4,033,955, Cl. 260-243.00R.
Powell, James E., to Shell Oil Company. N-(Arylsulfonyl)-2-nitro-2-(tetrahydro-2H-1,3-thiazin-2-ylidene)acetamides. 4,034,091, Cl. 424-246.000.
Powell, William R. Mass flow solar energy receiver. 4,033,118, Cl. 60-641.000.
PPG Industries, Inc.: *See—*
Chang, Wen-Hsuan; Erikson, J. Alden; and Scriven, Roger L., 4,034,017, Cl. 260-859.00R.
Cook, James A., Jr., 4,034,064, Cl. 423-272.000.
Drummond, Warren W., 4,033,741, Cl. 65-2.000.
Pradon, Jacques. Apparatus for handling bulk materials. 4,033,449, Cl. 198-520.000.
Presby, Herman Melvin, to Bell Telephone Laboratories, Incorporated. Solderable glass splices, terminations and hermetic seals. 4,033,668, Cl. 350-96.00C.
Presley, C. Travis: *See—*
Argabright, Perry A.; Presley, C. Travis; and Wenger, Charles B., 4,033,937, Cl. 260-77.5NC.
Preston, Norman R.: *See—*
Phripp, Clarence F.; and Preston, Norman R., 4,032,997, Cl. 4-52.000.
Prewer, John R. Housing systems and structures. 4,033,078, Cl. 52-79.500.
Price, Ralph E., to Landis Tool Company. Cylindrical grinding machine with workpiece loader and unloader. 4,033,076, Cl. 51-105.00R.
Pridham, Brian Frederick. Knitting machine stand. 4,033,537, Cl. 248-165.000.
Priemer, Joachim; Schenk, Norbert; Krekel, Jorg; and Schwerdtel, Wulf, to Bayer Aktiengesellschaft. Isolating naphthoquinone and phthalic anhydride from naphthalene oxidation product. 4,033,987, Cl. 260-346.400.
Priest, Anthony Victor Norton; and Schorr, Murray Arnold, to Barker, Alfred Walter. Position-transmitting equipment. 4,033,132, Cl. 60-572.000.
Pringle, William L., to United States Steel Corporation. Sofa bed. 4,032,999, Cl. 5-14.000.
Printronix, Inc.: *See—*
Kleist, Robert A.; and Matula, Jerry, 4,033,255, Cl. 101-93.040.
Pritchard, Frederick R.: *See—*
Lev, Yaacov; and Pritchard, Frederick R., 4,034,286, Cl. 324-71.00R.
Pritchet, Walter C.: *See—*
Berry, Brian S.; and Pritchet, Walter C., 4,033,795, Cl. 148-108.000.
Probert, Geoffrey, Jr., to Bell Telephone Laboratories, Incorporated. Method and apparatus for controlling a multiprocessor system. 4,034,347, Cl. 364-200.000.
Procter & Gamble Company, The: *See—*
Holcombe, Thomas Charles; and Schultz, Robert Howard, 4,033,718, Cl. 8-103.000.
Mattson, Fred Hugh, 4,034,083, Cl. 424-180.000.
Product Automation and Control Limited: *See—*
Wade, Kenneth Robinson, 4,034,235, Cl. 307-117.000.
Production Specialties, Inc.: *See—*
Hebert, Gerald P., 4,033,409, Cl. 166-117.500.
Produits Chimiques Ugine Kuhlmann: *See—*
Demarcq, Michel; and Sleziona, Joseph, 4,034,022, Cl. 260-955.000.
Projectus Industriprodukter AB: *See—*
Gustafsson, Berth Ulrik, 4,033,141, Cl. 62-238.000.
Prokai, Bela: *See—*
Sandner, Michael Ray; and Prokai, Bela, 4,033,911, Cl. 260-2.5AC.
Prokofiev, Jury Vladimirovich: *See—*
Tayakin, Jury Vasilievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,034,238, Cl. 307-221.00C.
Promecam Sisson-Lehmann: *See—*
Cailloux, Paul, 4,033,572, Cl. 269-320.000.
Properzi, Giulio. Casting wheel for a continuous casting machine of the wheel and belt type. 4,033,405, Cl. 164-278.000.
Propper Manufacturing Company, Inc.: *See—*
Raczkowski, Jan, 4,033,337, Cl. 128-2.05C.
Prosser, Barbara: *See—*
Liu, Chao-Min; Palleroni, Norberto; Hermann, Theron; and Prosser, Barbara, 4,033,823, Cl. 195-80.00R.
Provenzano, Albert J.: *See—*
Kirrish, Hail; and Provenzano, Albert J., 4,033,243, Cl. 85-4.000.
Pruitt, Martin Eugene: *See—*
Fritz, David Paul; Anderson, John Dale; Pruitt, Martin Eugene; Mahagan, Deroy Ernest; and Buller, Richard James, 4,033,101, Cl. 56-344.000.
Przybyla, Bernd: *See—*
Miller, Norbert; Schmidt, Peter Jurgen; and Przybyla, Bernd, 4,033,633, Cl. 303-97.000.
Przybyla, Richard L., to Dow Corning Corporation. Heat-curable silicone elastomers having unprimed adhesion. 4,034,140, Cl. 428-447.000.
Przygocki, Witold C., to Acme Manufacturing Company. Combination quick removal and adjustable width work pressure back-up roll or billet roll. 4,033,497, Cl. 226-194.000.
Puchalski, Walter J.: *See—*
McNally, Thomas J.; Mehling, Sigfried; and Puchalski, Walter J., 4,033,185, Cl. 73-147.000.
Puddington, Ira E.: *See—*
Capes, Charles E.; Germain, Rene J.; McIlhinney, Allan E.; Puddington, Ira E.; and Sirianni, Aurelio F., 4,033,729, Cl. 44-1.00A.
Pulak, Richard P., to Universal Oil Products Company. Spent catalyst regeneration apparatus with internal and external regenerated-catalyst recycle means. 4,033,726, Cl. 23-288.00B.
Pullen, Eric V.: *See—*
Manoogian, Alex; and Pullen, Eric V., 4,033,373, Cl. 137-454.600.
Purecо Systems, Inc.: *See—*
Stoltenberg, Donald A., 4,033,873, Cl. 210-186.000.
Pusch, James L.: *See—*
Barcell, Ernest A.; and Pusch, James L., 4,033,515, Cl. 241-27.000.

Puskas, Imre, to Standard Oil Company (Indiana). Alkenylation catalysts. 4,034,052, Cl. 260-671.00C.

Putz, Joachim E., to Edeleanu Gesellschaft mbH. Mineral oil dewaxing process with dehydration of feed and solvent. 4,033,855, Cl. 208-25.000.

Pyrotenax of Canada Limited: *See—*
Howie, David Malcolm; McKenzie, Roy Victor W.; and Snape, James Ronald, 4,033,028, Cl. 29-611.000.

Quadriga Art Co., Inc.: *See—*
Schulhof, Thomas B.; and Schulhof, Ronald M., 4,033,061, Cl. 40-158.00R.

Quaker Oats Company, The: *See—*
Anderson, Hugh C., 4,033,925, Cl. 260-42.530.

Queiser, Horst: *See—*
Meichsner, Othmar; and Queiser, Horst, 4,033,868, Cl. 210-38.00C.

Queneau, Paul B.: *See—*
Clark, Franklin F.; Nikolic, Cvetko B.; and Queneau, Paul B., 4,034,059, Cl. 423-144.000.

Quintilliano, Robert L., to Hooker Chemicals & Plastics Corporation. Heat exchanger cleaning system. 4,033,407, Cl. 165-95.000.

R. E. Phelon Company, Inc.: *See—*
Burson, Bob O., 4,033,311, Cl. 123-179.00K.

Raabe, Rodney Dean; and Dittberner, Ardie Reinhard, to General Electric Company. Electrical transfer switching apparatus having door interlock and plural switch interlock. 4,034,170, Cl. 200-50.00A.

Raczkowski, Jan, to Propper Manufacturing Company, Inc. Self-donned Sphygmomanometer cuff. 4,033,337, Cl. 128-2.05C.

Radcliffe, Paul Anthony Beaufort: *See—*
Owen, David Gregory; Ashworth, John Vernon; and Radcliffe, Paul Anthony Beaufort, 4,034,400, Cl. 358-75.000.

Radiation Limited: *See—*
Longworth, Alfred, 4,033,714, Cl. 431-354.000.

Radiochemical Centre Limited, The: *See—*
Lorch, Edgar Adolf; Fletcher, Keith Ernest; and Page, David, 4,033,884, Cl. 250-496.000.

Radtke, Charles S., to American Can Company. Method of forming an opening tab in sheet metal container end closures. 4,033,275, Cl. 113-121.00C.

Rajchman, Jan Aleksander: *See—*
Catanese, Carmen Anthony; Endriz, John Guiry; and Rajchman, Jan Aleksander, 4,034,255, Cl. 313-400.000.

Raley, Paul H.; Dunbeker, George H.; and Stark, Eugene E., to Rheem Manufacturing Company. Molded plastic container. 4,033,473, Cl. 220-66.000.

Ralston, Harry R.: *See—*
Little, Alma M.; and Ralston, Harry R., 4,033,269, Cl. 110-160.000.

Ralston Purina Company: *See—*
Dunn, Howard J.; and Farr, M. Paul, 4,034,121, Cl. 426-565.000.
Van Horn, Earl Thomas, 4,034,078, Cl. 424-76.000.

Ramanathan, Visvanathan; Della Casa, Angelo; de Montmollin, Rene; Hegar, Gert; and Schutz, Hans Ulrich, to Ciba-Geigy Corporation. Fiber reactive water soluble 2,4,6-triamino, 3-cyano pyridine-(5) azo dyestuffs. 4,033,943, Cl. 260-153.000.

Ramanathan, Visvanathan: *See—*
Defago, Raymond; Ramanathan, Visvanathan; and Back, Gerhard, 4,033,716, Cl. 8-2.50A.

Ramspott, Walter: *See—*
Kramer, Friedhelm; Wolfertz, Gunter; Klaus, Harald; Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, 4,033,012, Cl. 24-90.00D.

Randell, Donald Richard; Cook, Barry; and Chalmers, Alexander Michael, to Ciba-Geigy Corporation. Stabilized epoxy resins. 4,033,928, Cl. 260-45.80N.

Randlett, Myron R.: *See—*
Harvey, Walter W.; Randlett, Myron R.; and Bangerskis, Karlis I., 4,033,839, Cl. 204-108.000.

Rank Organisation Limited, The: *See—*
Haeder, Gert Wilhelm, 4,034,165, Cl. 179-115.50R.

Rank Xerox Ltd.: *See—*
Ohmori, Hitoshi; and Horie, Kiyoshi, 4,033,293, Cl. 118-653.000.
Takiguchi, Koichi, 4,034,188, Cl. 219-216.000.

Ranson, Harry Christopher: *See—*
Bickerdike, Robert Lewis; Clark, Douglas; Eastabrook, John Norman; Hughes, Garyth; Mair, William Norman; Partridge, Peter George; and Ranson, Harry Christopher, 4,033,793, Cl. 148-32.000.

Raschle, Josef, to Heberlein & Co. AG. Friction disc for driving twist tubes rotating at high speeds. 4,033,106, Cl. 57-77.450.

Rast, Gustaf J., Jr.: *See—*
Ashley, James R.; Barley, Thomas A.; and Rast, Gustaf J., Jr., 4,034,285, Cl. 324-57.00R.

Rathbun, Donald J., to Honeywell Information Systems, Inc. Apparatus, including delay means, for sampling and recovering data recorded by the double transition recording technique. 4,034,348, Cl. 364-200.000.

Rau, Robert Otto: *See—*
Pensa, Ildo Emil; and Rau, Robert Otto, 4,032,992, Cl. 2-243.00R.

Rau, Willy; and Taus, Christian, to Maschinenfabrik Rau oHG. Agricultural machine. 4,033,417, Cl. 172-613.000.

Raven Industries, Inc.: *See—*
Parsons, Roger R., 4,033,527, Cl. 244-99.000.

Ray, James Allen; and Lazio, Thomas Joseph, to Martin Marietta Corporation. Calcium aluminate cement compositions and mixes and method for preparing them. 4,033,782, Cl. 106-104.000.

Raymond Lee Organization, Inc., The: *See—*
Avalle, Angel C., 4,033,149, Cl. 66-111.000.
Bolden, Edward J., 4,033,430, Cl. 181-144.000.
Cox, Diane M., 4,033,619, Cl. 296-21.000.
Kern, Margaret Jean, 4,033,001, Cl. 5-343.000.
Norris, Frank John, 4,034,213, Cl. 240-6.40G.

Raytheon Company: *See—*
Kim, Chung Kyu, 4,033,810, Cl. 156-656.000.
Seidel, Harry W., 4,033,322, Cl. 126-200.000.

RCA Corporation: *See—*
Bloom, Allen; and Ross, Daniel Louis, 4,033,905, Cl. 252-500.000.
Busanovich, Charles John; and Moore, Robert Milton, 4,034,127, Cl. 427-76.000.
Catanese, Carmen Anthony; Endriz, John Guiry; and Rajchman, Jan Aleksander, 4,034,255, Cl. 313-400.000.
de Pierre, Richard; Forgays, Gilbert Jerome; Behling, Hans Heinrich; and Curtis, William Childs, 4,034,373, Cl. 343-7.700.
Dietz, Wolfgang Friedrich Wilhelm, 4,034,262, Cl. 315-408.000.
Dietz, Wolfgang Friedrich Wilhelm, 4,034,263, Cl. 315-408.000.
Drukier, Ira; and Mykietyn, Edward, 4,034,399, Cl. 357-68.000.
Firester, Arthur Herbert, 4,033,665, Cl. 350-3.500.
Heckman, LeRoy Francis, Jr.; and Pickard, James Bruce, 4,034,320, Cl. 333-82.00B.
Law, Harold Bell, 4,034,382, Cl. 354-1.000.
Schade, Otto Heinrich, Jr., 4,034,239, Cl. 307-238.000.
Schade, Otto Heinrich, Jr., 4,034,307, Cl. 330-35.000.

Reed, Jack Owen. Recovery of chorionic gonadotropic hormone from pregnant mares. 4,033,344, Cl. 128-214.00R.

Reed, Robert D.; and McGill, Eugene C., to John Zink Company. Apparatus for NO_x control using steam-hydrocarbon injection. 4,033,725, Cl. 23-277.00C.

Reichel, Wilfried. Apparatus having multiple heating wires for heating of a flat workpiece. 4,034,205, Cl. 219-385.000.

Reichenberger, Kurt: *See—*
Lein, Werner; Reichenberger, Kurt; and Schanze, Klaus, 4,033,260, Cl. 101-232.000.

Reijnierse, Pieter: *See—*
Saraga, Peter; and Reijnierse, Pieter, 4,034,344, Cl. 340-146.30H.

Reimert, Rainer: *See—*
Baron, Gerhard; Hafke, Carl; Engler, Dietrich; Reimert, Rainer; and Blaum, Eberhard, 4,033,730, Cl. 48-86.00R.

Renard, Michel: *See—*
Mailfert, Alain; and Renard, Michel, 4,034,245, Cl. 310-52.000.

Renard, Yves, to Thomson-CSF. Chopper-stabilized power supply. 4,034,282, Cl. 323-17.000.

Reneerkens, Josef, to Ford Motor Company. Method for preloading bearing. 4,033,644, Cl. 308-207.00A.

Rentmeester, Kenneth Richard, to American Can Company. Tubular body with a lap side seam. 4,033,474, Cl. 220-75.000.

Republic Steel Corporation: *See—*
Stone, Leonard R.; Aron, Steven J., Jr.; and Kemmerling, Robert A., 4,033,885, Cl. 250-496.000.

Restaino, Frederick A.: *See—*
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Reticon Corporation: *See—*
Pfoutz, Ray W.; Mauritz, Karl H.; and Skurla, John P., 4,033,697, Cl. 356-160.000.

Revhaug, Helge: *See—*
Andorsen, John Peter; Revhaug, Helge; and Nyberg, Ole, 4,033,596, Cl. 280-11.200.

Revlon, Inc.: *See—*
Gerstein, Terry, 4,033,895, Cl. 252-106.000.

Rexnord Inc.: *See—*
Kelsall, Frederick A., 4,033,451, Cl. 198-815.000.

Reyco Industries, Inc.: *See—*
Ward, James C.; and Davis, Robert Wayne, 4,033,606, Cl. 280-682.000.

Reynolds, Gary Raymond: *See—*
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Reynolds, Gordon S.: *See—*
Sorenson, James L.; Pannier, Karl A., Jr.; and Reynolds, Gordon S., 4,033,345, Cl. 128-214.00R.

Reynolds, Mervyn Frank: *See—*
Phillips, Ian Ross; and Reynolds, Mervyn Frank, 4,033,346, Cl. 128-223.000.

Reynolds Metals Company: *See—*
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Rheem Manufacturing Company: *See—*
Raley, Paul H.; Dunbeker, George H.; and Stark, Eugene E., 4,033,473, Cl. 220-66.000.

Rhoads, Roger R., to Owens-Illinois, Inc. Container with improved heat shrunk cellular sleeve. 4,034,131, Cl. 428-35.000.

Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, to Boehringer Mannheim G.m.b.H. Cyclopenteno[1,2-h]quinol-4-one derivatives. 4,033,967, Cl. 260-287.0CF.

Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; by Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, to Boehringer Mannheim G.m.b.H. Nitrogen containing derivatives of cyclopenteno-quinolone compounds and bacteriostatic compositions. 4,034,096, Cl. 424-258.000.

Rhone-Poulenc Industries: *See—*
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,034,088, Cl. 424-246.000.
Berger, Christian; Farge, Daniel; Gros, Georges; Messer, Mayer Naoum; and Moutonnier, Claude, 4,034,090, Cl. 424-246.000.
Coquard, Jean; Sedivy, Pierre; Ruaud, Michel; and Verrier, Jean, 4,032,993, Cl. 3-1.000.
Mazarguil, Honore; Meiller, Francois; and Monsan, Pierre, 4,034,139, Cl. 428-405.000.
Seigneurin, Laurent; and Brunet, Michel, 4,034,067, Cl. 423-462.000.

Rhone Poulenc S.A.: *See—*
Bargain, Michel; and Pasquini, Zeno, 4,033,731, Cl. 55-16.000.

Ribka, Joachim: *See—*
Bauer, Wolfgang; Krusche, Erwin; and Ribka, Joachim, 4,033,945, Cl. 260-157.000.

Rice, Clifford B.: *See—*
Rice, William A.; and Rice, Clifford B., 4,033,242, Cl. 93-51.00R.

Rice Packaging, Inc.: *See—*
Rice, William A.; and Rice, Clifford B., 4,033,242, Cl. 93-51.00R.

Rice, William A.; and Rice, Clifford B., to Rice Packaging, Inc. Carton forming machine. 4,033,242, Cl. 93-51.00R.

Richards, Fred W.: *See—*
Murawski, Frank H.; Elliott, James W.; Richards, Fred W.; and Johns, Gordon L., 4,033,336, Cl. 128-2.05R.

Richardson, David I.: *See—*
Klepak, Philip B.; Richardson, David I.; and Fourman, Robert G., 4,033,365, Cl. 132-89.000.

Richardson-Merrell Inc.: *See—*
Erickson, Raymond C.; and Bambury, Ronald E., 4,033,956, Cl. 260-243.00C.

Richmond, Abraham W., to Harris Corporation. Wide range power control for electric discharge lamp and press using the same. 4,033,263, Cl. 101-416.00A.

Richter, Volker: *See—*
Woellhaf, Josef; Balz, Werner; Falk, Roland; Scheffel, Dieter; Richter, Volker; and Willmann, Paul, 4,033,288, Cl. 118-52.000.

Ricoh Co., Ltd.: *See—*
Fujimoto, Sakae, 4,033,575, Cl. 271-3.000.
Isayama, Takuro, 4,034,380, Cl. 346-140.00R.
Yamashita, Tadashi, 4,034,221, Cl. 250-324.000.

Riedel, Richard: *See—*
Schoetensack, Wolfgang; and Riedel, Richard, 4,034,111, Cl. 424-319.000.

Riihinen, Kalevi, to Valmet Oy. Dewatering systems for paper machines. 4,033,812, Cl. 162-273.000.

Riken Keikinzoku Kogyo Kabushiki Kaisha: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; Kikuchi, Masaru; and Suzuki, Kazuo, 4,033,024, Cl. 29-403.000.

Rimar Meccanica S.p.A.: *See—*
Marchesini, Bruno; and Martini, Fernando, 4,033,152, Cl. 68-19.100.

Rimmrott, Manfred: *See—*
Muller, Kurt; Lendt, Hans-Jurgen; and Rimmrott, Manfred, 4,034,264, Cl. 361-2.000.

Rink, Rolf: *See—*
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, 4,033,315, Cl. 123-146.50A.

Ritter, Hans Georg: *See—*
Frentzen, Hermann Josef; Hendrix, Gerhard; Huppertz, Manfred; Ritter, Hans Georg; and Wittek, Fritz, 4,033,568, Cl. 269-26.000.

Rivers, Roy W., to Xerox Corporation. Scan interlock system. 4,034,407, Cl. 358-267.000.

Rivetti, Enrico: *See—*
Bertone, Antonino; Rivetti, Enrico; and Cattaneo, Maurizio, 4,033,638, Cl. 303-116.000.

Robert Bosch GmbH: *See—*
Fromel, Gerhard; and Langenberger, Peter, 4,033,507, Cl. 239-102.000.
Kroger, Uwe; Jaki, Friedrich; Brammer, Hartmut G.; Ehrmann, Karl; Magdefrau, Herbert; Brand, Gunter; Kalippke, Harald; and Rink, Rolf, 4,033,315, Cl. 123-146.50A.
Miller, Norbert; Schmidt, Peter Jurgen; and Przybyla, Bernd, 4,033,633, Cl. 303-97.000.

Roberts, Anthony Charles: *See—*
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Roberts, Gratz Linwood, Jr.: *See—*
Roberts, William Powell; and Roberts, Gratz Linwood, Jr., 4,033,339, Cl. 128-68.000.

Roberts, James Gordon. Multi-curdled milk product and the process for the preparation thereof. 4,034,115, Cl. 426-43.000.

Roberts, William Powell; and Roberts, Gratz Linwood, Jr., to said William P Roberts; by said Gratz L. Roberts. Cervical side posture table having effective head restraint means. 4,033,339, Cl. 128-68.000.

Robertshaw Controls Company: *See—*
Wolfe, Denis G., 4,033,029, Cl. 29-622.000.

Robertson, Forrest E.: *See—*
Williams, Donald E.; and Robertson, Forrest E., 4,033,271, Cl. 111-7.000.

Robinson, Max S.; and Studebaker, Thomas J., to Mohawk Data Sciences Corporation. Method of manufacturing keyswitch assemblies. 4,033,030, Cl. 29-622.000.

Robison, Charles D. Container. 4,033,455, Cl. 206-391.000.

Roch, Jacques Leon, to Electroglas, Inc. Micro-circuit test probe. 4,034,293, Cl. 324-158.00P.

Rockwell International Corporation: *See—*
Frey, Frederick E., 4,033,560, Cl. 226-157.000.
Hallock, David B., 4,034,304, Cl. 328-142.000.

Roda, Emilio, to Roda Macchine S.A. Apparatus for manufacturing cardboard tubes. 4,033,241, Cl. 93-39.10R.

Roda Macchine S.A.: *See—*
Roda, Emilio, 4,033,241, Cl. 93-39.10R.

Rody, Jean: *See—*
Lind, Hanns; Rody, Jean; and Brunnetti, Heimo, 4,034,006, Cl. 260-521.00C.

Rogers, Austin S., to W. R. Grace & Co. Wire line well tool and method. 4,033,413, Cl. 166-301.000.

Rogers, Garry W. C. Original configuration retention extendible roof sections by means of universal inserts. 4,033,621, Cl. 296-137.00B.

Rohm and Haas Company: *See—*
Kilbourn, Edward E.; and Weiler, Ernest D., 4,033,972, Cl. 260-294.80D.
Kittle, Paul A., 4,034,129, Cl. 427-163.000.
Lane, Constance A., 4,034,013, Cl. 260-835.000.

Rohr Industries, Inc.: *See—*
Heffner, George R., 4,033,033, Cl. 29-824.000.

Roland Offsetmaschinenfabrik Faber & Schleicher AG: *See—*
Fernandez, Eloy; Simeth, Claus; and Herzan, Georg, 4,033,261, Cl. 101-248.000.
Schuhmann, Siegfried, 4,033,259, Cl. 101-174.000.

Rolfe, Hugh Hicron, to Post Office, The. Apparatus for hauling cables or other elongate bodies. 4,033,496, Cl. 226-188.000.

Rolt, Anthony P. R.; and Walker, Frederick J., to Harry Ferguson Limited. Vehicle anti-skid braking apparatus. 4,033,636, Cl. 303-114.000.

Roma, Pierpaolo: *See—*
Bertelli, Guido; Roma, Pierpaolo; and Longi, Paolo, 4,033,915, Cl. 260-28.50A.

Roman, Manuel Morales. Apparatus for stapling heels. 4,033,498, Cl. 227-30.000.

Roman, Robert Justin, to Eastman Kodak Company. Film cartridge. 4,033,523, Cl. 242-198.000.

Romania, Samuel Richard; and Sprenkle, George Joseph, to Burroughs Corporation. Integrated circuit package removal tool. 4,033,032, Cl. 29-764.000.

Romrell, Delwin M., to Westinghouse Electric Corporation. Acoustic emission monitoring system. 4,033,179, Cl. 73-71.400.

Ronsaville, Edwin W., Jr.: *See—*
Hauser, Karl V.; and Ronsaville, Edwin W., Jr., 4,033,781, Cl. 106-90.000.

Rood, Robert W.: *See—*
Brantley, Lott W., Jr.; and Rood, Robert W., 4,033,676, Cl. 350-295.000.

Rosar, Edward C.; Dulin, Jacques M.; Genco, Joseph M.; and Rosenberg, Harvey S., to Industrial Resources, Inc. Process for control of SO_x emissions from copper smelter operations. 4,034,063, Cl. 423-244.000.

Rosby, Sven-Olof: *See—*
Axelsson, Birger; and Rosby, Sven-Olof, 4,033,732, Cl. 55-96.000.

Rose, William Henry: *See—*
Koppenheffer, Gary Jay; and Rose, William Henry, 4,034,178, Cl. 200-293.000.

Rosen, Perry, to Hoffman-La Roche Inc. 2,4-Diamino-pyrimidine derivatives and processes. 4,033,962, Cl. 260-256.40N.

Rosenberg, Harvey S.: *See—*
Rosar, Edward C.; Dulin, Jacques M.; Genco, Joseph M.; and Rosenberg, Harvey S., 4,034,063, Cl. 423-244.000.

Rosenblum, Stephen S.: *See—*
Steyert, William A., Jr.; and Rosenblum, Stephen S., 4,033,734, Cl. 62-3.000.

Rosensaft, Michael Norman: *See—*
Augurt, Thomas Anthony; Rosensaft, Michael Norman; and Perciaccante, Vincent Anthony, 4,033,938, Cl. 260-78.30R.

Roseveare, Ronald N.: *See—*
Holt, Amos E.; and Roseveare, Ronald N., 4,033,178, Cl. 73-71.5US.

Ross, Daniel Louis: *See—*
Bloom, Allen; and Ross, Daniel Louis, 4,033,905, Cl. 252-500.000.

Ross, Harold B., to Automation Industries, Inc. Electrical connector. 4,033,654, Cl. 339-143.00R.

Ross Operating Valve Company: *See—*
Miller, Raymond A., Jr.; and Thornton, Douglas M., 4,033,615, Cl. 285-333.000.

Rosser, William Morgan: *See—*
Fair, Richard Barton; Hayes, John Saylor; and Rosser, William Morgan, 4,033,027, Cl. 29-583.000.

Rossini, George D.: *See—*
Gerlach, Robert L.; and Rossini, George D., 4,033,904, Cl. 250-491.000.

Rotcman, Robert, to Abbott Laboratories. Preparation of dopamine derivatives. 4,033,997, Cl. 260-463.000.

Rothchild, Ronald D. Economical and laborsaving reinforcing bar coupler. 4,033,502, Cl. 228-56.000.

Rothgordt, Ulf: *See—*
Bunge, Ernst; Rothgordt, Ulf; Ehlers, Bernd; and Piotrowski, Herbert, 4,033,443, Cl. 197-1.00R.
Rowsell, David G.; and Hems, Roger, to Wilkinson Sword Limited. Compounds having a physiological cooling effect and compositions containing them. 4,034,109, Cl. 424-311.000.
Rowsell, David G.: *See—*
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., 4,033,994, Cl. 260-468.00R.
Rozylowicz, Edward Francis; and Twiselton, Steven Glen, to Motorola, Inc. RF power monitor utilizing bi-directional coupler. 4,034,289, Cl. 324-95.000.
Ruaud, Michel: *See—*
Coquard, Jean; Sedivy, Pierre; Ruaud, Michel; and Verrier, Jean, 4,032,993, Cl. 3-1.000.
Rudd, George E.: *See—*
Molnar, Albert J.; Rudd, George E.; and Meier, Joseph F., 4,033,593, Cl. 277-212.00F.
Rudd, Milo O. Two-mirror systems for periscopic rearward viewing. 4,033,678, Cl. 350-302.000.
Ruegger, Richard A., to United States of America, Navy. Bending and cutting tool. 4,033,388, Cl. 140-106.000.
Rusk, Thomas P., to Brown & Williamson Tobacco Corporation. Apparatus for interacting with articles passing therethrough. 4,033,283, Cl. 118-1.000.
Ruskin, Bernard J.: *See—*
Chapman, Earle F.; and Ruskin, Bernard J., 4,034,214, Cl. 240-70.000.
Russell, John G.: *See—*
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Rustogi, Kedar N.: *See—*
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Rutz, Peter, to Sulzer Brothers Limited. Hydrostatic piston machine having small clearances between bearing surfaces. 4,033,237, Cl. 91-484.000.
Ryan, James. Toy elastic band projectile-firing gun. 4,033,313, Cl. 124-17.000.
S.R.M. Hydromekanik Aktiebolag: *See—*
Ahlen, Karl Gustav; and Fabricius-Hansen, Rolf Leonard, 4,033,202, Cl. 74-866.000.
S&S Corrugated Paper Machinery Co., Inc.: *See—*
Flaum, Stephen S.; Connolly, Francis A.; and Chu, Paul, 4,033,217, Cl. 83-425.400.
Sada, Tomohiko: *See—*
Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, 4,033,840, Cl. 204-159.170.
Sadek, Lubos Vojtech: *See—*
Bolza, Frederick; Sadek, Lubos Vojtech; and Fox, Richard, 4,033,264, Cl. 102-24.00R.
Sader, George; and Osswald, Dieter, to Hoechst Aktiengesellschaft. Process and apparatus for copying on printing plates. 4,033,695, Cl. 355-87.000.
Safetran Systems Corporation: *See—*
Lutts, William M., 4,033,074, Cl. 51-178.000.
Sagarino, Robert F., to Bulova Watch Company, Inc. Solid-state electronic watch assembly. 4,033,110, Cl. 58-88.00R.
Sagarino, Robert F.: *See—*
Bennett, William O.; and Sagarino, Robert F., 4,033,108, Cl. 58-50.00R.
Sage Laboratories, Inc.: *See—*
Hoinash, Lynne E., 4,033,009, Cl. 16-114.00R.
Saiko, Alphons: *See—*
Spieldiener, Robert; Spieldiener, Reinhold; and Saiko, Alphons, 4,033,602, Cl. 280-605.000.
Saint-Gobain Industries: *See—*
Ulivi, Moreno, 4,033,490, Cl. 225-1.000.
Saito, Masaaki: *See—*
Kawamura, Yoshihisa; Saito, Masaaki; and Minami, Hidehiro, 4,033,170, Cl. 73-23.000.
Sakai, Ichio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Oil pressure control system for an automatic transmission system. 4,033,201, Cl. 74-869.000.
Sakai, Kenichi: *See—*
Kunioka, Kazuo; Kurihara, Kiwami; Sakasegawa, Koji; Ohsumi, Atushi; Watanabe, Akio; and Sakai, Kenichi, 4,033,737, Cl. 62-64.000.
Sakamaki, Hisashi; and Ohtani, Toshiyuki, to Canon Kabushiki Kaisha. Device for heat fixation. 4,034,189, Cl. 219-216.000.
Sakamoto, Masahiro: *See—*
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Sakasegawa, Koji: *See—*
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Sakurada, Nobuaki: *See—*
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Salk Institute for Biological Studies, The: *See—*
Lindstrom, Jon M., 4,033,722, Cl. 23-230.300.
Salter, Gary Curtis: *See—*
Barber, Herbert Douglas; and Salter, Gary Curtis, 4,034,306, Cl. 330-30.00D.
Salton, Inc.: *See—*
Moskowitz, Paul M., 4,033,516, Cl. 241-30.000.
Salukvadze, Viktor Samsonovich. Method of making rotary cutters. 4,033,204, Cl. 76-101.00A.
Salzer, Erwin. Electric fuse. 4,034,328, Cl. 337-159.000.
Samulowitz, Helmut, to U.S. Philips Corporation. Device for testing any leakage of vacuum-tight glass seals. 4,033,174, Cl. 73-40.000.
Sanders Associates, Inc.: *See—*
Bourgeois, Armand E., 4,033,529, Cl. 244-151.00B.
Sanders, Robert N.: *See—*
Johnston, James D.; Sanders, Robert N.; and Wood, James M., Jr., 4,033,758, Cl. 75-67.00R.
Johnston, James D.; Sanders, Robert N.; and Wood, James M., Jr., 4,033,759, Cl. 75-67.00R.
Sandner, Michael Ray; and Prokai, Bela, to Union Carbide Corporation. Process for catalyzing polyurethane foam formation using N,N-dimethyl-aminoalkoxy-propionitriles. 4,033,911, Cl. 260-2.5AC.
Sandoz, Inc.: *See—*
Barcza, Sandor; and Hendrickson, James B., 4,034,045, Cl. 260-590.0FB.
Sandoz Ltd.: *See—*
Bastian, Jean-Michel, 4,034,095, Cl. 424-256.000.
Hofer, Kurt; and Tscheulin, Guenther, 4,033,957, Cl. 260-246.00B.
Kaul, Bansi Lal, 4,033,963, Cl. 260-256.40C.
Sanken Electric Company Limited: *See—*
Morita, Kouichi; Sekine, Hirohito; and Ubukata, Takao, 4,034,281, Cl. 323-17.000.
Sano, Fumiaki: *See—*
Ueno, Masayuki; and Sano, Fumiaki, 4,033,565, Cl. 266-273.000.
Sano, Shunichi; and Ogawa, Youji, to Tokyo Shibaura Electric Co., Ltd. Deflection device for use in color television receiver. 4,034,324, Cl. 335-212.000.
Sant'Agostino, Marcello, to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA. System for determining the quality of transmission of incoming digital message signals. 4,034,340, Cl. 340-146.10R.
Santoni, Cesar, to Greif Bros. Corporation. Method and structure for retaining shipping drums on pallets. 4,033,454, Cl. 206-386.000.
Saponara, Arthur Michael. Pressurizing closure apparatus. 4,033,091, Cl. 53-88.000.
Saraga, Peter; and Reijniersе, Pieter, to U.S. Philips Corporation. Character thinning apparatus. 4,034,344, Cl. 340-146.30H.
Sargent, Frak T.; and Antos, John M., to Thetford Corporation. Sealing apparatus for toilet. 4,032,996, Cl. 4-17.000.
Sarkisian, Robert: *See—*
Hillstrom, David U., 4,033,536, Cl. 248-160.000.
Sarnelli, Charles, Jr. Tool for enlarging the bore in a workpiece. 4,033,229, Cl. 90-12.00R.
Sasaki, Koichi: *See—*
Washio, Takaji; Sasaki, Koichi; and Aizawa, Tatsuo, 4,033,689, Cl. 355-8.000.
Sasaki, Mitsuru; and Mukai, Kunio, to Sumitomo Chemical Company, Ltd. Preparation of 5-methyl-2-nitrophenol. 4,034,050, Cl. 260-622.00R.
Sasayama, Chikanobu; Suzuki, Osamu; Shimizu, Takeshi; and Chiba, Kunji, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Daiwa Boseki Kabushiki Kaisha. Method and apparatus for controlling driving operation of open-end spinning frame. 4,033,107, Cl. 57-81.000.
Sato, Katsujiro: *See—*
Inada, Masami; Kawabata, Yasuhiro; and Sato, Katsujiro, 4,033,125, Cl. 60-290.000.
Sato, Kozo. Method for preventing oxidation of melted metal. 4,033,762, Cl. 75-96.000.
Sato, Yoichi, to Nippon Electric Company, Ltd. Demodulator for signals hybrid modulated by more and less significant digit signals in succession in each clock interval. 4,034,305, Cl. 329-50.000.
Satomura, Masato: *See—*
Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.
Satzinger, Gerhard: *See—*
Stoss, Peter; and Satzinger, Gerhard, 4,033,981, Cl. 260-327.00M.
Sauer, Donald G., to National Can Corporation. Process for thermoforming hollow articles. 4,034,054, Cl. 264-93.000.
Sauer, Winfriede: *See—*
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,033,967, Cl. 260-287.0CF.
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,034,096, Cl. 424-258.000.
Sawa, Yoshio, to Kanebo, Ltd. Novel berbine derivatives. 4,033,966, Cl. 260-286.00Q.
Sawaki, Mikio; Iwataki, Isao; Hirono, Yoshihiko; and Ishikawa, Hisao, to Nippon Soda Company Limited. Substituted cyclohexene esters. 4,033,754, Cl. 71-112.000.
Saxonburg Ceramics, Inc.: *See—*
Golya, William R.; and Doornwaard, John, 4,033,776, Cl. 106-46.000.

Schade, Henry A., Jr.: *See—*
Willis, Barry G.; Schade, Henry A., Jr.; and Farrell, Michael J., 4,033,330, Cl. 128-2.00G.

Schade, Otto Heinrich, Jr., to RCA Corporation. Capacitance memories operated with intermittently-energized integrated circuits. 4,034,239, Cl. 307-238.000.

Schade, Otto Heinrich, Jr., to RCA Corporation. Current amplifier. 4,034,307, Cl. 330-35.000.

Schade, Steven Ray: *See—*
Wiese, Harold Herman; and Schade, Steven Ray, 4,033,228, Cl. 89-42.00B.

Schadlich, Gunther: *See—*
Moraw, Roland; and Schadlich, Gunther, 4,034,381, Cl. 346-151.000.

Schaefer, John G.; and Whitesel, Terry L., to Sundstrand Corporation. Fluid delivery system with a jet pump booster and means to maintain a constant rate of flow through the jet nozzle. 4,033,706, Cl. 417-79.000.

Schaefer, John T.: *See—*
Loest, Kent W.; and Schaefer, John T., 4,033,842, Cl. 204-180.00P.

Schaeffer-Homberg GmbH: *See—*
Kramer, Friedhelm; Wolfertz, Gunter; Klaus, Harald; Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, 4,033,012, Cl. 24-90.00D.

Schanze, Klaus: *See—*
Lein, Werner; Reichenberger, Kurt; and Schanze, Klaus, 4,033,260, Cl. 101-232.000.

Schaper, Manfred, to Canadian Marine Drilling Ltd. Underhull quick disconnect mooring system. 4,033,277, Cl. 114-230.000.

Schautz, Glenn A.: *See—*
Benjamin, Benjamin C.; and Schautz, Glenn A., 4,033,232, Cl. 91-47.000.

Scheffel, Dieter: *See—*
Woellhaf, Josef; Balz, Werner; Falk, Roland; Scheffel, Dieter; Richter, Volker; and Willmann, Paul, 4,033,288, Cl. 118-52.000.

Schenk, Norbert: *See—*
Priemer, Joachim; Schenk, Norbert; Krekel, Jorg; and Schwerdtel, Wulf, 4,033,987, Cl. 260-346.400.

Schenter, Robert E.: *See—*
Holt, Fred E.; Cash, Robert J.; and Schenter, Robert E., 4,033,813, Cl. 176-19.0LD.

Schering Aktiengesellschaft: *See—*
Nickolson, Robert C.; Kerb, Ulrich; and Wiechert, Rudolf, 4,033,995, Cl. 260-468.500.

Schiel, Christian; and Flamig, Hans, to J. M. Voith GmbH. Apparatus for changing the moisture content of paper webs or the like. 4,033,049, Cl. 34-115.000.

Schiffmann, Anton, to Arova Rorschach AG. Apparatus for orienting and for automatically piling up bobbins of yarn. 4,033,094, Cl. 53-242.000.

Schilling, Guenther: *See—*
Givner, Morris Lincoln; and Schilling, Guenther, 4,033,723, Cl. 23-253.00R.

Schlosser, Werner; and Berger, Horst, to Motoren- und Turbinen-Union Munchen GmbH. Method of fabricating rings from separate segments and fixture for use therewith. 4,034,182, Cl. 219-121.0EM.

Schlumberger Technology Corporation: *See—*
Nicolas, Yves, 4,033,187, Cl. 73-155.000.
Turcotte, Ronald E., 4,034,218, Cl. 250-269.000.

Schmalz, Roman; and Wolf, Robert J., to Logemann Brothers Company. Method for forming bales. 4,033,249, Cl. 100-3.000.

Schmelzer Corporation: *See—*
Benjamin, Benjamin C.; and Schautz, Glenn A., 4,033,232, Cl. 91-47.000.

Schmid, Markus, to Concast AG. Oscillatory mold equipped with a hollow mold cavity which is curved in the direction of travel of the strand. 4,033,404, Cl. 164-260.000.

Schmidhammer, Ludwig: *See—*
Dempf, Dominik; Fruhwirth, Otto; and Schmidhammer, Ludwig, 4,034,051, Cl. 260-652.50R.

Schmidt-Dunker, Manfred: *See—*
Ploger, Walter; Schmidt-Dunker, Manfred; and Gloxhuber, Christian, 4,034,086, Cl. 424-200.000.

Schmidt, Peter Jurgen: *See—*
Miller, Norbert; Schmidt, Peter Jurgen; and Przybyla, Bernd, 4,033,633, Cl. 303-97.000.

Schmidt, Volker. Apparatus for cutting strips of material. 4,033,215, Cl. 83-204.000.

Schneider, Abraham; and Janoski, Edward J., to Sun Ventures, Inc. Ionic hydrogenolysis of Binor-S for use as a high energy fuel. 4,033,799, Cl. 149-120.000.

Schoch, David K., to Audio Visual Innovators Corporation. Spare lamp control circuit for a light projection system. 4,034,259, Cl. 315-93.000.

Schoenberg, Emanuel, to Goodyear Tire & Rubber Company, The. Difunctional polymeric dienes. 4,034,000, Cl. 260-502.600.

Schoetensack, Wolfgang; and Riedel, Richard, to Byk Gulden Lomberg Chemische Fabrik GmbH. Compositions of and new uses for N-acylanilinobutyric acids. 4,034,111, Cl. 424-319.000.

Schoonman, Marten Leonard. Self-sanitizing plastic. 4,034,079, Cl. 424-83.000.

Schoppe, Wayne F.: *See—*
Taylor, Thomas N.; and Schoppe, Wayne F., 4,033,578, Cl. 271-157.000.

Schorr, Murray Arnold: *See—*
Priest, Anthony Victor Norton; and Schorr, Murray Arnold, 4,033,132, Cl. 60-572.000.

Schorsch, John B.; Graul, William E.; and Barash, David, to Union Corporation. Apparatus for refrigerating materials. 4,033,142, Cl. 62-381.000.

Schroder, Ernst: *See—*
Wermuth, Jurgen; Dickopp, Gerhard; and Schroder, Ernst, 4,034,308, Cl. 330-86.000.

Schuhmann, Siegfried, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Device for adjusting printing plates on the plate cylinder of printing presses. 4,033,259, Cl. 101-174.000.

Schulhof, Ronald M.: *See—*
Schulhof, Thomas B.; and Schulhof, Ronald M., 4,033,061, Cl. 40-158.00R.

Schulhof, Thomas B.; and Schulhof, Ronald M., to Quadriga Art Co., Inc. Display folder. 4,033,061, Cl. 40-158.00R.

Schuller, Ronald A.: *See—*
Wheatley, Charles; Schuller, Ronald A.; and Hogan, A., 4,033,550, Cl. 251-328.000.

Schultz, Robert Howard: *See—*
Holcombe, Thomas Charles; and Schultz, Robert Howard, 4,033,718, Cl. 8-103.000.

Schulze, Stephen R., to Allied Chemical Corporation. Stress-crack resistant ethylene-perhaloethylene terpolymers. 4,033,939, Cl. 260-878.00R.

Schumann, Gunter: *See—*
Johne, Hans; Jentzsch, Arndt; and Schumann, Gunter, 4,033,262, Cl. 101-350.000.

Schumann, Paul A., Jr.: *See—*
Demsky, Herbert M.; Mathisen, Einar S.; Schumann, Paul A., Jr.; and Tong, Alvin H., 4,033,698, Cl. 356-173.000.

Schuster, Robert W., to Bendix Corporation, The. Fuel control for gas turbine engine. 4,033,112, Cl. 60-39.28R.

Schutz, Hans Ulrich: *See—*
Ramanathan, Visvanathan; Della Casa, Angelo; de Montmollin, Rene; Hegar, Gert; and Schutz, Hans Ulrich, 4,033,943, Cl. 260-153.000.

Schwander, Hansrudolf, to Ciba-Geigy Corporation. Oxadiazol-5-yl-coumarin derivatives. 4,033,973, Cl. 260-295.00F.

Schwander, Hansrudolf: *See—*
Burdeska, Kurt; and Schwander, Hansrudolf, 4,033,965, Cl. 260-279.00R.

Schwartz, Jean-Pierre: *See—*
Bregeon, Louis; Dupuy, Gerard; Lerouge, Bernard; and Schwartz, Jean-Pierre, 4,033,814, Cl. 176-63.000.

Schwartz, John G., Jr.: *See—*
Lunde, James M.; and Schwartz, John G., Jr., 4,033,038, Cl. 30-382.000.

Schwartz, Joseph B.; and Restaino, Frederick A., to Merck & Co., Inc. Method of preparing multi-toned tablets. 4,034,035, Cl. 264-77.000.

Schwartz, Stuart: *See—*
Brodman, Bruce W.; Devine, Michael P.; and Schwartz, Stuart, 4,033,798, Cl. 149-92.000.

Schweitzer, Edmund O., Jr. System for disabling the reset circuit of fault indicating means. 4,034,360, Cl. 340-253.00A.

Schweizerische Isola-Werke: *See—*
Andres, Werner; Diehl, Ernst; and Marti, Werner, 4,034,153, Cl. 174-120.0SR.

Schwender, Charles F.; and Sunday, Brooks R., to Warner-Lambert Company. Pyrido[2-1-b]quinazolin-ones and their methods of preparation. 4,033,961, Cl. 260-251.00A.

Schwerdtel, Wulf: *See—*
Priemer, Joachim; Schenk, Norbert; Krekel, Jorg; and Schwerdtel, Wulf, 4,033,987, Cl. 260-346.400.

Scifres, Donald R.: *See—*
Burnham, Robert D.; and Scifres, Donald R., 4,033,796, Cl. 148-175.000.

Scott & Fetzer Company, The: *See—*
McKee, Donald S., 4,033,397, Cl. 160-393.000.

Scott, Garland E., Jr.; and Levenson, Michael K., to General Electric Company. Chemically polished polycrystalline alumina material. 4,033,743, Cl. 65-30.00R.

Scott, William Lafayette: *See—*
DiMartini, Carl Richard; Scott, William Lafayette; and Bulvanoski, Leo James, 4,033,761, Cl. 75-77.000.

Scriven, Roger L.: *See—*
Chang, Wen-Hsuan; Erikson, J. Alden; and Scriven, Roger L., 4,034,017, Cl. 260-859.00R.

Scrivens, George W., to Johnson & Johnson. Surgical drape having improved retaining means. 4,033,341, Cl. 128-132.00D.

Sea-Log Corporation: *See—*
Stiles, Kenneth M., 4,033,279, Cl. 114-243.000.

Seaquist Valve Company: *See—*
Kirkel, David L., 4,033,486, Cl. 222-190.000.

Seaton Engineering Company: *See—*
Seaton, William W.; and Miller, George C., 4,033,403, Cl. 164-155.000.

Seaton, William W.; and Miller, George C., to Seaton Engineering Company. Synchronizing velocity and position control. 4,033,403, Cl. 164-155.000.

Sedivy, Pierre: *See—*
Coquard, Jean; Sedivy, Pierre; Ruaud, Michel; and Verrier, Jean, 4,032,993, Cl. 3-1.000.

Seidel, Harry W., to Raytheon Company. Oven door structure. 4,033,322, Cl. 126-200.000.

Seifert, Horst: *See—*
Lersmacher, Bernhard; Seifert, Horst; and Krol, Johannes Wilhelmus Antonius, 4,034,031, Cl. 264-25.000.

Seigneurin, Laurent; and Brunet, Michel, to Rhone-Poulenc Industries. Hydroxychlorides of aluminum and method. 4,034,067, Cl. 423-462.000.

Seiko Koki Kabushiki Kaisha: *See—*
Nakamura, Yukio; Kato, Shougo; and Nagaoka, Shinji, 4,033,682, Cl. 352-235.000.

Sekhar, Neel C., to Upjohn Company, The. Process for inhibiting platelet aggregation. 4,033,816, Cl. 195-1.800.

Seki, Hajime, to International Business Machines Corporation. Erasable visual image display device. 4,033,673, Cl. 350-160.00R.

Sekiguchi, Takeshi, to Canon Kabushiki Kaisha. Zoom lens having a wide magnification variation range. 4,033,674, Cl. 350-184.000.

Sekine, Hirohito: *See—*
Morita, Kouichi; Sekine, Hirohito; and Ubukata, Takao, 4,034,281, Cl. 323-17.000.

Sekiwa, Tetuo: *See—*
Naito, Makoto; Kawachi, Masaru; Sekiwa, Tetuo; Akatsuka, Minoru; Kasami, Akinobu; and Toyama, Masaharu, 4,033,291, Cl. 118-412.000.

Sekmakas, Kazys; and Shah, Raj, to DeSoto, Inc. Electrodeposition of aqueous dispersions of copolymers of polyethylenically unsaturated epoxy-amine adducts. 4,033,917, Cl. 260-29.20N.

Seng, Florin; and Ley, Kurt, to Bayer Aktiengesellschaft. 2-Mercaptoquinoxaline-di-N-oxide products and a method for their preparation. 4,033,960, Cl. 260-250.0QN.

Senghaas, Karl A.: *See—*
Hudson, Donald C.; Morris, Charles R.; Fleck, Horst G.; and Senghaas, Karl A., 4,034,225, Cl. 250-471.000.

Senko Medical Instrument Mfg. Co. Ltd.: *See—*
Tamiya, Tatsuo, 4,033,724, Cl. 23-258.5BH.

Sensoli, Robert A.: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,033,766, Cl. 75-123.0CB.

Seragnoli, Enzo, to G. D. Societa per Azioni. Device for reducing noise in gear wheel couplings, with a high safety degree. 4,033,198, Cl. 74-443.000.

Setele, William O.: *See—*
Miller, Donald A.; and Setele, William O., 4,033,643, Cl. 308-187.200.

Setliff, James E.: *See—*
Zinsmeyer, Herbert G.; Johnson, Rodney L.; Genz, Ralph H.; and Setliff, James E., 4,033,883, Cl. 250-231.0SE.

Sevenet, Thierry; Thal, Claude; Potier, Pierre; and Husson, Henri Philippe, to Agence Nationale de Valorisation de la Recherche (ANVAR). Vincamine derivatives. 4,033,969, Cl. 260-293.530.

Sewell, William. Groundable lamp receptacle. 4,033,655, Cl. 339-14.00R.

Seyler, Jay K.: *See—*
Hughes, John L.; Seyler, Jay K.; and Liu, Robert C., 4,033,940, Cl. 260-112.50S.

Sfregola, Michele: *See—*
Cocuzza, Gioacchino; Torreggiani, Gianni; and Sfregola, Michele, 4,033,617, Cl. 203-27.000.

Shaffer, Raymond E.: *See—*
Merola, Carl R.; Evans, William F.; and Shaffer, Raymond E., 4,033,738, Cl. 62-158.000.

Shah, Raj: *See—*
Sekmakas, Kazys; and Shah, Raj, 4,033,917, Cl. 260-29.20N.

Shahar, Moshe. Concrete shuttering connecting means. 4,033,548, Cl. 249-194.000.

Shaler, Amos J.: *See—*
Gurwell, William E.; and Shaler, Amos J., 4,033,400, Cl. 164-98.000.

Shannon, Jesse Max. Fishing lure. 4,033,065, Cl. 43-42.130.

Shatterproof Glass Corporation: *See—*
Krebs, Jacob, 4,033,321, Cl. 126-198.000.

Shavel, John, Jr.: *See—*
Cohen, Marvin P.; Shavel, John, Jr.; and von Strandtmann, Max, 4,033,845, Cl. 260-240.00D.

Sheesley, Jay R., to Keystone Industries, Inc. Automotive vehicle door retarding and closing mechanism. 4,033,616, Cl. 292-216.000.

Sheets, Kerney T. Lawn sprinkler and fertilizer dispenser. 4,033,509, Cl. 239-226.000.

Sheldrake, Charles Peter Hedley; and Blake, Timothy Gunton, to Electro-Optick, N.V. Optical and mechanical improvements for television projection system. 4,034,398, Cl. 358-60.000.

Shell Internationale Research Maatschappij B.V.: *See—*
Lev, Yaacov; and Pritchard, Frederick R., 4,034,286, Cl. 324-71.00R.

Shell Oil Company: *See—*
Kauffman, David, 4,033,410, Cl. 166-244.00C.
Kiovsky, Thomas E., 4,033,888, Cl. 252-56.00D.
Kiovsky, Thomas E., 4,033,889, Cl. 252-56.00D.
Maxwell, Ian E., 4,033,903, Cl. 252-476.000.
Powell, James E., 4,033,955, Cl. 260-243.00R.
Powell, James E., 4,034,091, Cl. 424-246.000.
Tieman, Charles H., 4,033,952, Cl. 260-243.00R.
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Shelley Manufacturing Company Division of Alco Food Service Equipment Company: *See—*
House, Bruce F., 4,033,478, Cl. 221-279.000.

Shelver, Lyle N. Thermal glass structural method and device. 4,033,087, Cl. 52-741.000.

Sheppard, Jay W. Football kicker's strap. 4,033,581, Cl. 273-55.00B.

Shibahara, Masashi, to Nihon Hammond Kabushiki Kaisha. Tempo setting device. 4,033,220, Cl. 84-1.030.

Shiflet, Frank L., to Hopeman Brothers, Inc. Wallboards. 4,033,084, Cl. 52-573.000.

Shikama, Takashi: *See—*
Tamada, Minoru; Shikama, Takashi; and Nakamura, Toshikazu, 4,034,207, Cl. 219-517.000.

Shikiya, Hajime; Nakanishi, Seiichi; Yoshida, Zitsuo; and Hirakawa, Kenkichi, to Kuboto Tekko Kabushiki Kaisha. Transmission for tractor. 4,033,197, Cl. 74-331.000.

Shimanuki, Fujio: *See—*
Kotezawa, Katsutaka; Onodera, Toshimi; Hayashi, Setsuo; and Shimanuki, Fujio, 4,034,295, Cl. 325-39.000.

Shimizu, Akira; Kusano, Manabu; and Takami, Takeshi, to Kuraray Co., Ltd. Rubber compositions and methods for production thereof stabilized. 4,033,933, Cl. 260-45.85R.

Shimizu, Shigeki: *See—*
Matsui, Goro; Toda, Koji; Shimizu, Shigeki; Horiishi, Nanao; and Takedoi, Atushi, 4,033,891, Cl. 252-62.560.

Shimizu, Takeshi: *See—*
Sasayama, Chikanobu; Suzuki, Osamu; Shimizu, Takeshi; and Chiba, Kunji, 4,033,107, Cl. 57-81.000.

Shimomura, Jun, to Nippon Kogaku K.K. Numerical display element. 4,034,368, Cl. 340-378.00R.

Shin-Etsu Chemical Company, Limited: *See—*
Shinohara, Toshio; and Arai, Masatoshi, 4,033,991, Cl. 260-448.20E.

Shingu, Iichi; Kondo, Yutaka; and Nishina, Shuho, to Toyota Jidosha Kogyo Kabushiki Kaisha. Electrical ignition circuit for gas generator. 4,033,610, Cl. 280-737.000.

Shinoda, Nobuhiko: *See—*
Mashimo, Yukio; Ito, Tadashi; Shinoda, Nobuhiko; Sakurada, Nobuaki; and Ito, Fumio, 4,034,383, Cl. 354-23.00D.

Shinohara, Toshio; and Arai, Masatoshi, to Shin-Etsu Chemical Company, Limited. Method for preparing organosilanes containing silicon-bonded oxime groups. 4,033,991, Cl. 260-448.20E.

Shinyei Kaisha: *See—*
Fujishiro, Takeshi; and Sunano, Naomasa, 4,033,169, Cl. 73-23.000.

Shiota, Ryoji: *See—*
Sugimoto, Yutaka; and Shiota, Ryoji, 4,033,554, Cl. 254-185.00B.

Shiwaku, Takayuki; and Miyazaki, Takeshi, to Mitutoyo Manufacturing Co., Ltd. Gas leakage measuring device. 4,033,175, Cl. 73-49.200.

Shoemaker, Arthur H., to American Optical Corporation. Microscope vertical illuminor. 4,033,666, Cl. 350-91.000.

Shono, Tetsuji: *See—*
Urano, Fumio; and Shono, Tetsuji, 4,034,390, Cl. 354-244.000.

Shulgin, Alexander T. Treatment of senile geriatric patients to restore performance. 4,034,113, Cl. 424-330.000.

Shushpan, Stanislav Mikhailovich: *See—*
Dmitriev, Vasily Petrovich; Polyakov, Anatoly Mikhailovich; Tomilin, Alexandr Grigorievich; and Shushpan, Stanislav Mikhailovich, 4,033,116, Cl. 60-39.28R.

Sidorenko, Vladimir Pavlovich: *See—*
Tayakin, Jury Vasilievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,034,238, Cl. 307-221.00C.

Siegerland-Bremsen, Firma: *See—*
Henrich, Helmut, 4,033,434, Cl. 188-75.000.

Siemens Aktiengesellschaft: *See—*
Arauner, Alfred, 4,034,228, Cl. 250-511.000.
Hetzel, Gert, 4,033,351, Cl. 128-303.140.
Maier, Bruno, 4,034,371, Cl. 343-6.00R.
Muller, Kurt; Lendt, Hans-Jurgen; and Rimmrott, Manfred, 4,034,264, Cl. 361-2.000.
Taubert, Werner, 4,033,446, Cl. 197-157.000.

Silva, Frank A.; and Mayer, Robert W., to Amerace Corporation. Splice connector with internal heat transfer jacket. 4,034,151, Cl. 174-73.00R.

Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., to United States of America, Agriculture. Chemical attractant for smaller European bark beetle. 4,034,080, Cl. 424-84.000.

Silvestri, Achille, to United States of America, Army. Unitary sampling and analysis strip and process. 4,033,720, Cl. 23-230.00R.

Simeone, John B.: *See—*
Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., 4,034,080, Cl. 424-84.000.

Simeth, Claus: *See—*
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Simmons, Richard W., to Bendix Corporation, The. Programmable interface controller for numerical machine systems. 4,034,354, Cl. 364-900.000.

Simon, Horst: *See—*
Bethmann, Heinz G.; Kilguss, Heinz; and Simon, Horst, 4,034,391, Cl. 354-289.000.

Sims, Dewey M., Jr., to Burroughs Corporation. Plunger-actuated, lost motion switch with tactile feedback. 4,034,177, Cl. 200-159.00R.

Sindelar, William Frank: *See—*
Chester, Nelson Sherwood; Laughon, Thomas Cecil; and Sindelar, William Frank, 4,033,077, Cl. 51-170.00T.

Singer Company, The: *See—*
Danon, Joseph Solomon, 4,033,374, Cl. 137-461.000.
Mishcon, Lester; and Christopoulos, John, 4,033,150, Cl. 66-138.000.

Singer, Malcolm S., to Chevron Research Company. Nematocidal N-cyanoformyl carbamates and N-cyanoformyl thiolcarbamates. 4,034,105, Cl. 424-300.000.

Sinha, Ashok Kumar: *See—*
Alexander, Frank Bernard, Jr.; Capio, Cesar Deduyo; Hauser, Victor Emerald, Jr.; Levinstein, Hyman Joseph; Mogab, Cyril Joseph; Sinha, Ashok Kumar; and Wagner, Richard Siegfried, 4,033,287, Cl. 118-49.10R.

Siragusa, Judith Ann, to Personal Products Company. Method of inhibiting microbial activity using insoluble dialdehyde polysaccharides. 4,034,084, Cl. 424-180.000.

Sirianni, Aurelio F.: *See—*
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Sirota, Alexandr Yakovlevich: *See—*
Tayakin, Jury Vasilievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich, 4,034,238, Cl. 307-221.00C.

Skillman, Jack J. Structural module. 4,033,068, Cl. 46-1.00L.

Skinner, Frank R., II: *See—*
MacFarlane, Thomas R.; and Skinner, Frank R., II, 4,033,448, Cl. 198-465.000.

Skurla, John P.: *See—*
Pfoutz, Ray W.; Mauritz, Karl H.; and Skurla, John P., 4,033,697, Cl. 356-160.000.

Slater, Don. Drill bit for coupling to a wire fishing adapter. 4,033,703, Cl. 408-211.000.

Slaughter, Albert E.; and Slaughter, Nan Burke. Process for refurbishing metal buoys. 4,033,023, Cl. 29-401.00B.

Slaughter, Nan Burke: *See—*
Slaughter, Albert E.; and Slaughter, Nan Burke, 4,033,023, Cl. 29-401.00B.

Sleziona, Joseph: *See—*
Demarcq, Michel; and Sleziona, Joseph, 4,034,022, Cl. 260-955.000.

Slinn, Dennis Stanley: *See—*
Heavens, Michael; James, Richard Charles; and Slinn, Dennis Stanley, 4,034,224, Cl. 250-439.00P.

Slo Release, Inc.: *See—*
Moore, William Percy, 4,033,745, Cl. 71-28.000.

Smartt, Herschel B.: *See—*
Cole, Gerald S.; Kovacs, Bela V.; Sensoli, Robert A.; and Smartt, Herschel B., 4,033,766, Cl. 75-123.0CB.

Smith, Curtiss A., to Davis-Smith Corporation. Magnetic transducer apparatus with damped spring action. 4,034,412, Cl. 360-103.000.

Smith, Hubert Stacy, Jr., to Dow Chemical Company, The. Method for spiral deposition of an integrally bonded hollow foamed synthetic resin strip. 4,034,027, Cl. 264-32.000.

Smith, James L.: *See—*
Tanton, George A.; and Smith, James L., 4,033,670, Cl. 350-151.000.

Smith, Joseph W.: *See—*
Duffey, James R.; and Smith, Joseph W., 4,033,163, Cl. 72-121.000.

Smith Kline & French Laboratories Limited: *See—*
Durant, Graham John; Ganellin, Charon Robin; and Owen, Geoffrey Robert, 4,034,101, Cl. 424-273.000.

Smith, Leslie Harold, to Imperial Chemical Industries Limited. Alkanolamine derivatives. 4,034,106, Cl. 424-304.000.

Smith, Leslie Harold, to Imperial Chemical Industries Limited. Ethanolamine derivatives having β-adrenergic blocking activity. 4,034,112, Cl. 424-321.000.

Smith, Richard Dunham, to United States of America, Administrator, Environmental Protection Agency. Solid fuel fired gas turbine system having continuously regenerating granular filter. 4,033,117, Cl. 60-39.46S.

Smith, Richard E.: *See—*
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,033,574, Cl. 271-3.000.
Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., 4,033,579, Cl. 271-195.000.

Smith, Robert A. Game system. 4,033,584, Cl. 273-85.00A.

Smith, Robert H.; and Benford, Howard L., to Chrysler Corporation. Integral torsion bar — strut front suspension system. 4,033,605, Cl. 280-664.000.

SmithKline Corporation: *See—*
Berges, David A., 4,034,092, Cl. 424-246.000.

Smiths Industries Limited: *See—*
Mann, George, 4,034,401, Cl. 358-93.000.

Smorang, Lawrence: *See—*
Windsor, Lynne E.; and Smorang, Lawrence, 4,034,204, Cl. 219-368.000.

Snape, James Ronald: *See—*
Howie, David Malcolm; McKenzie, Roy Victor W.; and Snape, James Ronald, 4,033,028, Cl. 29-611.000.

Sneed, Richard J.: *See—*
Krikorian, Esther; and Sneed, Richard J., 4,033,843, Cl. 204-192.00P.

Snyder, Kenneth J.: *See—*
Lawson, Michael B.; and Snyder, Kenneth J., 4,033,784, Cl. 134-20.000.

Societa' Italiana Resine S.I.R. S.p.A.: *See—*
Cocuzza, Gioacchino; Torreggiani, Gianni; and Sfregola, Michele, 4,033,617, Cl. 203-27.000.

Societe Anonyme Automobiles Citroen: *See—*
Grosseau, Albert, 4,033,423, Cl. 180-41.000.

Societe Anonyme de Telecommunications: *See—*
Aveneau, Andre A.; and de Passoz, Guy A., 4,034,236, Cl. 307-261.000.

Societe Anonyme de Vehicules Industriels et d'Equipements Mecaniques (SAVIEM): *See—*
Labat, Pierre, 4,033,437, Cl. 192-53.00F.

Societe d'Apparetillage Electrique Saparfi: *See—*
Canonne, Paul, 4,034,322, Cl. 335-42.000.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation: *See—*
Evrard, Gerard Maurice Gaspard, 4,033,533, Cl. 248-358.00R.

Soderlund, Leif Ake, to Alfa-Laval AB. Arrangement for reducing vacuum in milking machines. 4,033,295, Cl. 119-14.440.

Soffge, Friedhelm; Piper, Ortwin; and Albrecht, Gerhard, to Dr. -Ing. H.c.F. Porsch Aktiengesellschaft. Swingable support leg for a bridge. 4,033,006, Cl. 14-75.000.

SOFRESID, Societe Francaise d'Etude d'Installations Siderurgiques: *See—*
Dhelft, Patrick, 4,033,561, Cl. 266-193.000.

Sokolovsky, Stanislav Antonovich: *See—*
Kiselev, Jury Yakovlevich; Merkher, Alexandr Mikhailovich; and Sokolovsky, Stanislav Antonovich, 4,034,250, Cl. 313-32.000.

Sommerkamp, Peter; and Heil, Walter, to Leybold-Heracus GmbH & Co. Electron gun for heating, fusing and vaporizing. 4,034,256, Cl. 313-440.000.

Sonnenschein, George: *See—*
United States of America, National Aeronautics and Space Administration; Sonnenschein, George; and McKeown, Daniel, 4,033,503, Cl. 228-124.000.

Sony Corporation: *See—*
Fujiwara, Yoshio; Naito, Keiichi; Fujimoto, Yoshinobu; Odashima, Tooru; and Sada, Tomohiko, 4,033,840, Cl. 204-159.170.

Soot, Olaf. Nuclear fuel storage rack. 4,034,227, Cl. 250-507.000.

Sopizet, Rene: *See—*
le Gressus, Claude; Massignon, Daniel; and Sopizet, Rene, 4,034,220, Cl. 250-310.000.

Sora, Albert: *See—*
Marino, Armando V.; and Sora, Albert, 4,034,171, Cl. 200-51.00R.

Sorenson, James L.; Pannier, Karl A., Jr.; and Reynolds, Gordon S., to Sorenson Research Co., Inc. Autologous transfusion filter system and method. 4,033,345, Cl. 128-214.00R.

Sorenson Research Co., Inc.: *See—*
Sorenson, James L.; Pannier, Karl A., Jr.; and Reynolds, Gordon S., 4,033,345, Cl. 128-214.00R.

Sorgatz, Ulrich; and Kogge, Hans-Jurgen, to Volkswagenwerk Aktiengesellschaft. Shaft mounting apparatus. 4,033,642, Cl. 308-26.000.

Southern Weaving Company: *See—*
Burnett, Jack W., III, 4,034,150, Cl. 174-69.000.

Southwire Company: *See—*
Locst, Kent W.; and Schaefer, John T., 4,033,842, Cl. 204-180.00P.

Spalding, Williard P., to Westinghouse Air Brake Company. Automatic freight car brake apparatus with spring-applied fluid-pressure-released hand brake. 4,033,629, Cl. 303-2.000.

Spanjer Brothers, Inc.: *See—*
Donatelle, Leo P., 4,033,218, Cl. 83-478.000.

Spatz Corporation: *See—*
Spatz, Walter B., 4,033,700, Cl. 401-180.000.

Spatz, Walter B., to Spatz Corporation. Dispenser for fluent material. 4,033,700, Cl. 401-180.000.

Spector, George: *See—*
Conn, John L.; and Spector, George, 4,034,231, Cl. 290-53.000.

Spectra-Strip Corporation: *See—*
Lang, Donald D., 4,034,148, Cl. 174-34.000.

Spencer, Harvey J., to Paper Converting Machine Company. Apparatus for handling wound rolls. 4,033,862, Cl. 209-73.000.

Sperry Rand Corporation: *See—*
Monaco, Robert F.; and Derchak, Nicholas, 4,034,349, Cl. 364-200.000.
Torok, Ernest J.; Kaske, Alan D.; Krawczak, John A.; and Paul, Maynard C., 4,034,359, Cl. 340-174.0TF.
Wing, Willis G., 4,033,045, Cl. 33-275.00G.

Spieldiener, Reinhold: *See—*
Spieldiener, Robert; Spieldiener, Reinhold; and Saiko, Alphons, 4,033,602, Cl. 280-605.000.

Spieldiener, Robert; Spieldiener, Reinhold; and Saiko, Alphons, to Intamin AG. Ski brake. 4,033,602, Cl. 280-605.000.

Sprenkle, George Joseph: *See—*
Romania, Samuel Richard; and Sprenkle, George Joseph, 4,033,032, Cl. 29-764.000.

Springer, Hartmut *See—*
Meininger, Fritz; Hunger, Klaus; and Springer, Hartmut, 4,033,980, Cl. 260-314.500.

Sprung, Joseph A.; Panasik, Theodore; and Holmes, James J., to GAF Corporation. Amphoteric maleic anhydride copolymers and photographic emulsions employing the same. 4,033,772, Cl. 96-114.000.

Srinivasan, Venkataraman: *See—*
Bestel, John Louis; Haynes, Richard; and Srinivasan, Venkataraman, 4,033,833, Cl. 204-15.000.

Stach, Kurt, deceased: *See—*
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,033,967, Cl. 260-287.0CF.
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,034,096, Cl. 424-258.000.

Stamer, Walter, to Claudius Peters AG. Valve system for protection of the valve from abrasion. 4,033,549, Cl. 251-86.000.

Standard Oil Company (Indiana): *See—*
Eberle, Frederick L.; and Ostrofsky, Bernard, 4,033,176, Cl. 73-67.900.
Farr, John B., 4,033,429, Cl. 181-106.000.
Puskas, Imre, 4,034,052, Cl. 260-671.00C.

Stanfield, Jay E., to J.I.M. Corporation. Paper feeding and receiving systems for presses and duplicators. 4,033,576, Cl. 271-5.000.

Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Document handling apparatus. 4,033,574, Cl. 271-3.000.

Stange, Klaus K.; Smith, Richard E.; Hamlin, Thomas J.; and Cassano, James R., to Xerox Corporation. Offset stacker. 4,033,579, Cl. 271-195.000.

Stangroom, James Edward, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Electric field responsive fluids. 4,033,892, Cl. 252-76.000.

Stanik, Raimund: *See—*
Kramer, Friedhelm; Wolfertz, Gunter; Klaus, Harald; Stanik, Raimund; Appelt, Horst Gustav; and Ramspott, Walter, 4,033,012, Cl. 24-90.00D.

Stanley, Richard B. Synchronized linear actuator. 4,033,194, Cl. 74-89.150.

Stant Manufacturing Company, Inc.: *See—*
Evans, John H., 4,033,475, Cl. 220-202.000.

Stark, Eugene E.: *See—*
Raley, Paul H.; Dunbeker, George H.; and Stark, Eugene E., 4,033,473, Cl. 220-66.000.

Starks, Charles M., to Continental Oil Company. Nonflammable coating material. 4,033,983, Cl. 260-33.6UA.

Starkweather, Gary K., to Xerox Corporation. Flying spot scanner. 4,034,408, Cl. 358-293.000.

Stauffer Chemical Company: *See—*
Toy, Arthur D. F.; and Uhing, Eugene H., 4,034,024, Cl. 260-981.000.

Steel, Margaret Lillian; and Holt, Frank, to Imperial Chemical Industries, Limited. Treatment process. Re. 29,295, Cl. 106-308C.

Steele, Arthur J.: *See—*
Christian, Joseph C.; and Steele, Arthur J., 4,033,711, Cl. 431-66.000.

Steetley Limited: *See—*
Gilpin, William Cecil; Heasman, Noel; and Williamson, John, 4,033,778, Cl. 106-58.000.

Stefanucci, Arthur: *See—*
Hamell, Matthew; Stefanucci, Arthur; and Ward, William W., 4,034,116, Cl. 426-131.000.

Steiner, Eginhard: *See—*
Beffa, Fabio; Back, Gerhard; and Steiner, Eginhard, 4,033,942, Cl. 260-145.00A.

Stenkvist, Sven-Einar. Method and apparatus for equalizing the wall lining wear in three phase alternating current electric arc furnaces. 4,034,146, Cl. 13-11.000.

Sterling, Henley F.; and Drake, Miles P., to International Standard Electric Corporation. Method for selective plating. 4,033,832, Cl. 204-15.000.

Steward, John M. Moving screen arrangement. 4,034,272, Cl. 318-7.000.

Stewart, Robert C. Vapor actuated power generating device. 4,033,136, Cl. 60-671.000.

Steyert, William A., Jr.; and Rosenblum, Stephen S. Continuous, noncyclic magnetic refrigerator and method. 4,033,734, Cl. 62-3.000.

Stiles, Claude J.; and Tomo, Daniel, to National Distillers and Chemical Corporation. Plastic skin envelopes for glass bottles and the like. 4,033,929, Cl. 264-45.900.

Stiles, Kenneth M., to Sea-Log Corporation. Faired cable for anchoring offshore structures. 4,033,279, Cl. 114-243.000.

Stilz, John G.; and Jackson, Richard L., to Eli Lilly and Company. Process for purifying glucagon. 4,033,941, Cl. 260-112.50R.

Stine, Joe C., to Houston Systems, Inc. Pipe handling system for vessels. 4,033,465, Cl. 214-13.000.

Stockton, Thomas R., to Ford Motor Company. Five speed overdrive transmission. 4,033,200, Cl. 74-740.000.

Stokes, Kenneth B.: *See—*
Helland, John R.; and Stokes, Kenneth B., 4,033,357, Cl. 128-418.000.

Stollenwerk, Hubert C.; and Stollenwerk, Hubert F. Fruit press. 4,033,253, Cl. 100-118.000.

Stollenwerk, Hubert F.: *See—*
Stollenwerk, Hubert C.; and Stollenwerk, Hubert F., 4,033,253, Cl. 100-118.000.

Stoltenberg, Donald A., to Pureco Systems, Inc. Filtration apparatus and pressure seal. 4,033,873, Cl. 210-186.000.

Stone, Clement A.: *See—*
Callery, Patrick S.; Zenker, Nicolas; Wright, Jeremy; and Stone, Clement A., 4,034,100, Cl. 424-272.000.

Stone, Leonard R.; Aron, Steven J., Jr.; and Kemmerling, Robert A., to Republic Steel Corporation. Apparatus for collimation of radiation signals for long distance transmission and method of construction therefor. 4,033,885, Cl. 250-496.000.

Stone, Spencer A., to Deister Concentrator Company Inc. Apparatus for separating high gravity from low gravity fractions of a coal or an ore. 4,033,863, Cl. 209-159.000.

Stonkus, John: *See—*
Berger, Abe, 4,033,934, Cl. 260-46.50G.

Stormann-Menninger-Lerchenthal, Heimo: *See—*
Zolss, Gerhard; Pittner, Heribert; and Stormann-Menninger-Lerchenthal, Heimo, 4,034,009, Cl. 260-553.00A.

Stoss, Peter; and Satzinger, Gerhard, to Warner-Lambert Company. Thianthrene and phenoxathiine s-oximides. 4,033,981, Cl. 260-327.00M.

Stowell, Michael James; Watts, Brian Michael; Emley, Edward Frederick; and Grimes, Roger, to British Aluminum Company, Limited, The; and T. I. (Group Services) Limited. Aluminium base alloys. 4,033,794, Cl. 148-32.000.

Streckenbach, Wulf-Christian, to Licentia Patent-Verwaltungs-G.m.b.H. Circuit arrangement for evaluating received oscillations of a predetermined frequency. 4,034,300, Cl. 325-390.000.

Strelitz, Robert A.: *See—*
Grier, Nathaniel; Dybas, Richard A.; and Strelitz, Robert A., 4,033,748, Cl. 71-67.000.

Strempel, Thomas G.; and Hora, Charles J., to Diamond Shamrock Corporation. Wafer electrode for an electrolytic cell. 4,033,848, Cl. 204-284.000.

Strickler, Herbert S., to Allegheny General Hospital. Immunoassay procedures. 4,034,071, Cl. 424-1.000.

Strike, Donald P.; and Kao, Wen-Ling, to American Home Products Corporation. Prostaglandin derivatives. 4,034,002, Cl. 260-514.00D.

Strike, Donald Peter, to American Home Products Corporation. 15-Substituted prostanoic acid. 4,033,985, Cl. 260-340.900.

Stroble, Michael F. Method and apparatus for releasing a drill string held by differential pressure. 4,033,414, Cl. 166-301.000.

Strong, Herbert M.; and Tuft, Roy E., to General Electric Company. Method and high pressure reaction vessel for quality control of diamond growth on diamond seed. 4,034,066, Cl. 423-446.000.

Strongin, Ned; Fogarty, A. Edward; and Fogarty, Bonnie Rose. Toy foam glider. 4,033,070, Cl. 46-79.000.

Strongin, Ned; Fogarty, A. Edward; and Fogarty, Bonnie Rose. Sucking doll with cheekflexing means operated by turning bottle. 4,033,071, Cl. 46-118.000.

Strutzel, Hans; Gneuss, Detlef; and Klenk, Ludwig, to Hoechst Aktiengesellschaft. Tubular film of polyethylene terephthalate and process for the production thereof. 4,034,055, Cl. 264-95.000.

Stubberfield, Pamela May: *See—*
King, Hewson Nicholas Graham; Mansell, John Revere; and Stubberfield, Pamela May, 4,034,254, Cl. 313-400.000.

Studebaker, Thomas J.: *See—*
Robinson, Max S.; and Studebaker, Thomas J., 4,033,030, Cl. 29-622.000.

Sturesson, Rune, to Dynapac Maskin AB. Steering apparatus for road rollers. 4,033,427, Cl. 180-140.000.

Stutzman, Howard A., to Atlas Industries, Inc. Refrigeration compressor structures and their methods of construction. 4,033,707, Cl. 417-312.000.

Suer, James David, to Cincinnati Milacron, Inc. Thermal protection for D.C. motors. 4,034,415, Cl. 361-24.000.

Suga, Hisashi: *See—*
Hayashi, Masaki; Kori, Seiji; Miyake, Hajimu; Yamato, Takashi; and Suga, Hisashi, 4,034,003, Cl. 260-514.00D.

Sugihara, Kunihiko; Hioki, Kazuo; and Muranaka, Shigeo, to Nissan Motor Co., Ltd. Exhaust gas recirculation system. 4,033,306, Cl. 123-119.00A.

Sugihara, Kunihiko: *See—*
Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Aoyama, Syunichi, 4,033,308, Cl. 123-119.00A.
Hayashi, Yoshimasa; Nakajima, Yasuo; Sugihara, Kunihiko; and Nagumo, Shin-ichi, 4,033,309, Cl. 123-119.00A.

Sugimoto, Yutaka, to Kabushiki Kaisha Komatsu Seisakusho. Double-drum winch. 4,033,553, Cl. 254-185.00B.

Sugimoto, Yutaka; and Shiota, Ryoji, to Kabushiki Kaisha Komatsu Seisakusho. Double-drum winch. 4,033,554, Cl. 254-185.00B.

Sugioka, Takami: *See—*
Abe, Isamu; and Sugioka, Takami, 4,033,519, Cl. 242-18.00A.

Sugioka, Yasuji, to Taiyo Seiki Co., Ltd. Bookbinding machine. 4,033,004, Cl. 11-1.0AD.

Sugiura, Akio: *See—*
Arai, Hiroshi; Nogami, Takahiro; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,033,634, Cl. 303-103.000.

Sugiyama, Takashi; and Tsuda, Takashi, to Yokogawa Electric Works, Ltd. Analog-to-digital converter utilizing a random noise source. 4,034,367, Cl. 340-347.0AD.

Sullivan, Robert Patton, to Combustion Engineering, Inc. Bottom supported, hopper bottom furnace for pulverized coal firing. 4,033,298, Cl. 122-510.000.

Sulzer Brothers Limited: *See—*
Frey, Otto, 4,032,994, Cl. 3-1.912.
Gsching, Wilhelm, deceased, 4,033,239, Cl. 92-58.000.
Mandrin, Charles, 4,033,135, Cl. 60-648.000.
Rutz, Peter, 4,033,237, Cl. 91-484.000.
Wlodawer, Robert, 4,033,401, Cl. 164-121.000.

Sumimura, Shinichi: *See—*
Mine, Katsutoshi; Nishio, Minoru; and Sumimura, Shinichi, 4,033,924, Cl. 260-37.0SB.

Sumitomo Chemical Company, Ltd.: *See—*
Hashimoto, Shunichi; and Kirino, Osamu, 4,033,752, Cl. 71-93.000.
Sasaki, Mitsuru; and Mukai, Kunio, 4,034,050, Cl. 260-622.00R.

Sun, Kwok K., to Upjohn Company, The. Purification of methylenedianilines. 4,034,039, Cl. 260-570.00D.

Sun Ventures, Inc.: *See—*
Hancock, Allen W., II; and Vanderwerff, William D., 4,034,005, Cl. 260-515.00P.
Schneider, Abraham; and Janoski, Edward J., 4,033,799, Cl. 149-120.000.

Sunano, Naomasa: *See—*
Fujishiro, Takeshi; and Sunano, Naomasa, 4,033,169, Cl. 73-23.000.

Sunday, Brooks R.: *See—*
Schwender, Charles F.; and Sunday, Brooks R., 4,033,961, Cl. 260-251.00A.

Sundeen, Joseph E.: *See—*
Hauck, Frederic Peter; and Sundeen, Joseph E., 4,033,971, Cl. 260-293.720.

Sundén, Olof. Cellulose and cellulose products modified by silicic acid. 4,033,913, Cl. 260-17.00R.

Sundstrand Corporation: *See—*
Baits, Stephen S., 4,033,115, Cl. 60-39.09R.
Schaefer, John G.; and Whitesel, Terry L., 4,033,706, Cl. 417-79.000.

Sundt, Erling; and Ohloff, Gunther, to Firmenich S.A. Menthone-8-thiol, carvomenthone-8-thiol and process for preparing same. 4,034,044, Cl. 260-586.00R.

Sunkist Growers, Inc.: *See—*
Paddock, Paul F.; and Cramer, Jerry W., 4,033,450, Cl. 198-648.000.

Suntech, Inc.: *See—*
Angstadt, Howard P., 4,034,047, Cl. 260-610.00B.
Felton, George F., Jr., 4,033,886, Cl. 252-34.700.
Hansel, William B.; and Lindeman, Myrl A., 4,033,389, Cl. 141-207.000.

Sunwa Sharyo Mfg. Co., Ltd.: *See—*
Ikarimoto, Yasuaki, 4,033,421, Cl. 180-8.00A.

Superior Electric Company, The: *See—*
Leenhouts, Albert C., 4,034,277, Cl. 318-685.000.

Support Systems, Inc.: *See—*
Doring, Lawrence C.; and Williams, Robert E., Jr., 4,033,653, Cl. 312-253.000.

Sussman, Walter. Gonioscope. 4,033,679, Cl. 351-16.000.

Suzuki, Hideaki: *See—*
Nakamura, Tetsuro; and Suzuki, Hideaki, 4,034,396, Cl. 357-30.000.

Suzuki, Kazuo; and Akuta, Shinichiro, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Magnetic recording medium. 4,034,410, Cl. 360-55.000.

Suzuki, Kazuo: *See—*
Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; Kikuchi, Masaru; and Suzuki, Kazuo, 4,033,024, Cl. 29-403.000.

Suzuki, Osamu: *See—*
Sasayama, Chikanobu; Suzuki, Osamu; Shimizu, Takeshi; and Chiba, Kunji, 4,033,107, Cl. 57-81.000.

Svenska Tobaks AB: *See—*
Almqvist, Sven-Olof; Enzell, Curt R.; Hjern, Lasse O.; Artho, Antoine; and Koch, Robert, 4,033,362, Cl. 131-264.000.

Svensson, Sven-Hakan: *See—*
Eklund, John Folke; and Svensson, Sven-Hakan, 4,033,227, Cl. 89-34.000.

Sweet, David L.: *See—*
Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., 4,033,608, Cl. 280-711.000.

Sweet, Philip J.; Hamlet, Buck C.; and Sweet, David L., to American Carrier Equipment. Air spring unit. 4,033,608, Cl. 280-711.000.

Sweet, Roger G., to Catalyst Research Corporation. Thermal deferred action battery with interconnecting, foldable electrodes. 4,034,143, Cl. 429-112.000.

Swenson, Henry F., to J & S Tool Company, Inc. Live center with hydraulic pressure indicator. 4,033,210, Cl. 82-31.000.

Swenson, Henry F., to J & S Tool Company, Inc. Replaceable flinger for live centers. 4,033,211, Cl. 82-33.00R.

Swenson, Leonard K., to J. F. Pritchard and Company. Single mixed refrigerant, closed loop process for liquefying natural gas. 4,033,735, Cl. 62-9.000.

Swiger, James W. Electrical connector. 4,033,662, Cl. 339-113.00R.

SWS Silicones Corporation: *See—*
Lengnick, Guenther Fritz, 4,033,902, Cl. 252-441.000.

Syntex (U.S.A.) Inc.: *See—*
Untch, Karl G.; and Gardner, John O., 4,033,978, Cl. 260-306.70R.

Szekely, Akos: *See—*
Trumble, John H.; and Szekely, Akos, 4,033,323, Cl. 126-263.000.

Szuberla, John H.: *See—*
Hrdlicka, Eugene R.; Vincolese, George J.; and Szuberla, John H., 4,034,157, Cl. 179-1.0PC.

T. I. (Group Services) Limited: *See—*
Stowell, Michael James; Watts, Brian Michael; Emley, Edward Frederick; and Grimes, Roger, 4,033,794, Cl. 148-32.000.

Taga, Yutaka: *See—*
Kuramochi, Kojiro; and Taga, Yutaka, 4,033,146, Cl. 64-23.000.

Taguchi, Tetsuya: *See—*
Tsunekawa, Tokuichi; Nakamoto, Soichi; and Taguchi, Tetsuya, 4,034,384, Cl. 354-33.000.

Tahara, Kumeo, to Motorola, Inc. Magnetic head lifting device. 4,034,413, Cl. 360-106.000.

Taiyo Seiki Co., Ltd.: *See—*
Sugioka, Yasuji, 4,033,004, Cl. 11-1.0AD.

Takagi, Izumi; and Asazuma, Masayuki, to Kawasaki Heavy Industries, Ltd. Driven clutch device for V-belt type automatic transmission. 4,033,195, Cl. 74-230.17M.

Takahashi, Toshiro; Nagano, Toshihiro; Nakamura, Katsuhiko; Kikuchi, Masaru; and Suzuki, Kazuo, to Riken Keikinzoku Kogyo Kabushiki Kaisha. Method for producing extruded structural profiles from scrap materials of aluminum based metal. 4,033,024, Cl. 29-403.000.

Takami, Takeshi: *See—*
Shimizu, Akira; Kusano, Manabu; and Takami, Takeshi, 4,033,933, Cl. 260-45.85R.

Takase, Tsuneo; and Yamaguchi, Tetsuo, to Tokyo Shibaura Electric Co., Ltd. Time correction circuits for electronic timepieces. 4,033,109, Cl. 58-85.500.

Takashina, Naomitsu: *See—*
Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, 4,033,890, Cl. 252-62.10L.

Takechi, Taichi: *See—*
Mitsui, Hisayasu; Kamiuchi, Jun-ichi; Kumazawa, Ryozi; Umemoto, Kimikazu; Yamada, Toshimitsu; Yoshida, Katsuhiko; and Takechi, Taichi, 4,033,805, Cl. 156-185.000.

Takeda Chemical Industries, Ltd.: *See—*
Funakoshi, Yoshiro; Matsumura, Yoshihiko; Yamamoto, Masaki; and Komeda, Hiromu, 4,034,126, Cl. 427-8.000.

Takeda, Toshio: *See—*
Tomisawa, Norio; Uchiyama, Yasuji; Okumura, Takatoshi; and Takeda, Toshio, 4,033,221, Cl. 84-1.030.

Takedoi, Atushi: *See—*
Matsui, Goro; Toda, Koji; Shimizu, Shigeki; Horiishi, Nanao; and Takedoi, Atushi, 4,033,891, Cl. 252-62.560.

Takeuchi, Akihiro: *See—*
Asai, Kiyokazu; and Takeuchi, Akihiro, 4,034,244, Cl. 310-8.200.

Takeuchi, Shinjiro: *See—*
Kobayashi, Toshihiko; Kanbayashi, Tetsusaburo; Ichioka, Satoshi; Takeuchi, Shinjiro; and Matsushima, Yukinori, 4,034,180, Cl. 219-85.0BM.

Takezoe, Fumihiko, to Fuji Electric Company Ltd. Method and apparatus for transmitting common information in the information processing system. 4,034,351, Cl. 364-200.000.

Takiguchi, Koichi, to Rank Xerox, Ltd. Heat fixing device for copying machine. 4,034,188, Cl. 219-216.000.

Tamada, Minoru; Shikama, Takashi; and Nakamura, Toshikazu, to Murata Manufacturing Co., Ltd. Positive temperature coefficient semiconductor heating element. 4,034,207, Cl. 219-517.000.

Tamai, Yasuo; Honjo, Satoru; Osawa, Sadao; Satomura, Masato; Osada, Chiaki; Nagashima, Wakio; and Takashina, Naomitsu, to Fuji Photo Film Co., Ltd.; and Mitsubishi Gas Chemical Company, Inc. Liquid developer for electrophotography. 4,033,890, Cl. 252-62.10L.

Tamiya, Tatsuo, to Senko Medical Instrument Mfg. Co. Ltd. Oxygenator having a variable capacity oxygenating tube. 4,033,724, Cl. 23-258.5BH.

Tanaka, Jinkichi: *See—*
Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, 4,034,179, Cl. 219-74.000.

Tancredi, Henry J. Image viewing apparatus. 4,033,683, Cl. 353-7.000.

Tandrup, Leif Borge: *See—*
Nicolaisen, Holger; Andersen, Finn Schnoor; and Tandrup, Leif Borge, 4,034,327, Cl. 337-41.000.

Tanigawa, Kou; Hashikawa, Kenzo; and Ota, Jun, to Fujitsu Ten Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Check circuit for checking vehicle warning system. 4,034,369, Cl. 340-52.00F.

Taninaka, Kuniaki; Kurono, Hitoshi; and Kasai, Tsutomu, to Nihon Nohyaku Co. Ltd. 4-Substituted-1,3-dithiolan-2-ylidene malonates and pharmaceutical compositions containing the same. 4,034,102, Cl. 424-277.000.

Tanton, George A.; and Smith, James L., to United States of America, Army. Zeeman effect optical isolator. 4,033,670, Cl. 350-151.000.

Taschner, Raymond George: *See—*
Moehle, Kenneth Albert; and Taschner, Raymond George, 4,033,542, Cl. 248-358.0AA.

Tashiro, Eiji, to Tokyo Plywood Kabushiki Kaisha. Plate block. 4,033,082, Cl. 52-316.000.

Tashiro, Isao: *See—*
Fukuda, Takeo; and Tashiro, Isao, 4,034,364, Cl. 340-347.0NT.

Tatemoto, Jirou: *See—*
Kobayashi, Hitoshi; and Tatemoto, Jirou, 4,033,072, Cl. 47-62.000.

Taube, Donald R., to Essex Group, Inc. Apparatus and method for forming dynamoelectric machine field windings by pushing. 4,033,385, Cl. 140-92.100.

Taubert, Werner, to Siemens Aktiengesellschaft. Three-position ribbon guide for printer. 4,033,446, Cl. 197-157.000.

Taus, Christian: *See—*
Rau, Willy; and Taus, Christian, 4,033,417, Cl. 172-613.000.

Tausch, Gerald, to Miller-Holzwarth, Inc. Periscope blackout blind construction. 4,033,677, Cl. 350-301.000.

Tayakin, Jury Vasilievich; Sidorenko, Vladimir Pavlovich; Sirota, Alexandr Yakovlevich; Prokofiev, Jury Vladimirovich; and Kopytov, Alexandr Maximovich. Field effect transistor information transfer circuit for use in storage register. 4,034,238, Cl. 307-221.00C.

Taylor, Gregg W., to A.H.P., Inc. Analysis of gentian violet residue in tissue. 4,033,721, Cl. 23-230.00B.

Taylor, Herbert E.; and Evans, Frederick P., to P/A Industries, Inc. Fluid flow distribution device and strip oiler system utilizing the same. 4,033,289, Cl. 118-227.000.

Taylor, Ronald Wayne: *See—*
Berenson, Walter Louis; and Taylor, Ronald Wayne, 4,034,296, Cl. 325-62.000.

Taylor, Thomas N.; and Schoppe, Wayne F., to Xerox Corporation. Stack elevating apparatus. 4,033,578, Cl. 271-157.000.

Taylor Woodrow Construction Limited: *See—*
Webber, John William Robert; and Roberts, Anthony Charles, 4,033,815, Cl. 176-87.000.

Teijin Limited: *See—*
Abe, Isamu; and Sugioka, Takami, 4,033,519, Cl. 242-18.00A.

Teijin Seiki Co., Ltd.: *See—*
Abe, Isamu; and Sugioka, Takami, 4,033,519, Cl. 242-18.00A.

Tektronix, Inc.: *See—*
Allen, David William; and Borchert, Marshall Bond, 4,034,291, Cl. 324-121.00R.

Telautograph Corporation: *See—*
Muller, Alex Marcel; and Tyrrell, Joseph Leslie, 4,034,155, Cl. 178-19.000.

Teldix GmbH: *See—*
Leiber, Heinz, 4,033,637, Cl. 303-115.000.

Teletype Corporation: *See—*
Berry, James M., 4,034,379, Cl. 346-1.000.
Heeren, Richard H., 4,034,242, Cl. 307-269.000.

Temco Metal Products Company, Inc.: *See—*
Keller, Russell D., 4,033,369, Cl. 137-68.00R.

ten Broeke, Jan; Grabowski, Edward J. J.; Flataker, Lars M.; Fisher, Michael H.; and Patchett, Arthur A., to Merck & Co., Inc. Diazatetracyclododecanes. 4,033,968, Cl. 260-288.0CF.

Tenneco Chemicals, Inc.: *See—*
Gottesman, Roy Tully, 4,034,007, Cl. 260-524.00R.

Terasawa, Hidenori; and Mori, Ikuo, to Nippon Kogaku K.K. Wide angle lens. 4,033,675, Cl. 350-216.000.

Terrett, Joann: *See—*
Inzana, Margaret; and Terrett, Joann, 4,033,364, Cl. 132-88.500.

Texaco Inc.: *See—*
Bennett, Richard H.; Klock, Byron V.; and Brockington, James W., 4,033,899, Cl. 252-420.000.
Buinicky, Ernest P.; Durkin, Joseph A.; and Estes, John H., 4,033,901, Cl. 252-432.000.
Colvert, James H.; Jahnke, Frederick C.; and Williams, Dale, 4,033,856, Cl. 208-102.000.
Williams, Dale; Colvert, James H.; and Jahnke, Frederick C., 4,033,857, Cl. 208-102.000.

Texas Instruments Incorporated: *See—*
Ehlers, Brian C.; and Boulanger, Henry J., 4,034,234, Cl. 307-116.000.

Textron, Inc.: *See—*
Kirrish, Hail; and Provenzano, Albert J., 4,033,243, Cl. 85-4.000.
Manning, Harry F., 4,033,014, Cl. 24-205.16R.
Moertel, George B., 4,034,056, Cl. 264-281.000.

Thal, Claude: *See—*
Sevenet, Thierry; Thal, Claude; Potier, Pierre; and Husson, Henri Philippe, 4,033,969, Cl. 260-293.530.

Thary, Christian; Bernard, Armand R.; Labadie, Jean Francois; and De La Taille, Olivier P., to Etablissements Bertrand Faure. Child's safety restraint for use in a vehicle. 4,033,623, Cl. 297-390.000.

Thermology, Inc.: *See—*
Trumble, John H.; and Szekely, Akos, 4,033,323, Cl. 126-263.000.

Therrien, Norman W. Display container. 4,033,452, Cl. 206-.830.

Thetford Corporation: *See—*
Sargent, Frak T.; and Antos, John M., 4,032,996, Cl. 4-17.000.

Thimmonier S.A.: *See—*
Burgat, Georges; and Guillemaut, Bernard, 4,033,096, Cl. 53-386.000.

Thomas, David E.; McCoy, Marion B.; and Chaky, Michael J., to NCR Corporation. Method and apparatus for testing data processing machines. 4,034,194, Cl. 235-153.0AC.

Thomasset, Andre Alphonse, to Planet-Wattohm. Oscillating suspension for strips of plastic material. 4,033,396, Cl. 160-332.000.

Thompson Manufacturing Company: *See—*
Jennison, James M.; and Williams, Henry Thomas, 4,033,510, Cl. 239-230.000.

Thomson-CSF: *See—*
Armand, Marc, 4,034,312, Cl. 331-96.000.
Hartemann, Pierre, 4,034,288, Cl. 324-80.000.
Mourier, Georges, 4,034,258, Cl. 315-39.000.
Renard, Yves, 4,034,282, Cl. 323-17.000.

Thorn, Lawrence B.: *See—*
Betts, Robert E.; Thorn, Lawrence B.; and Maykut, Albert R., 4,033,121, Cl. 60-271.000.

Thornton, Douglas M.: *See—*
Miller, Raymond A., Jr.; and Thornton, Douglas M., 4,033,615, Cl. 285-333.000.

Thorsteinson, Erlind Magnus: *See—*
Kurtz, Abraham Nathan; Thorsteinson, Erlind Magnus; and Decker, Harry Joe, 4,034,008, Cl. 260-533.00N.

Thwaites, Peter John; and Joyce, Peter Waterworth, to Dufaylite Developments Limited. Structural cellular materials. 4,033,251, Cl. 100-95.000.

Tieman, Charles H., to Shell Oil Company. 1,1,1-Trichloro-3-(tetrahydro-2H-1,3-thiazin-2-ylidene)-2-propanone. 4,033,952, Cl. 260-243.00R.

Tieman, Charles H., to Shell Oil Company. 3-(5,6-Dihydro-4H-1,3-thiazin-2-yl)-3-nitro-2-propenoic acid. 4,033,953, Cl. 260-243.00R.

Tieman, Charles H., to Shell Oil Company. 3,4-Dihydro-7-hydroxy-8-nitro-2H-pyrrolo(2,1-b)-(1,3)thiazin-6(7H)-one. 4,033,954, Cl. 260-243.00R.

Tien, Rex Y.: *See—*
Castenson, Richard L.; Hazen, James R.; and Tien, Rex Y., 4,033,986, Cl. 260-345.200.

Tinsley, John M.: *See—*
Holtmyer, Marlin D.; Githens, Charles J.; and Tinsley, John M., 4,033,415, Cl. 166-308.000.

Tipton, Larry J., to ACF Industries, Incorporated. Metering rod control for an air valve carburetor. 4,034,029, Cl. 261-44.00R.

Tipton, Peter William, to John Wyeth & Brother Limited. Apparatus for handling coverslips. 4,033,809, Cl. 156-572.000.

Tjernagel, Gerald P.: *See—*
Larsen, Otis M.; Larsen, Richard D.; Tjernagel, Gerald P.; and Marine, Steven L., 4,033,826, Cl. 195-139.000.

Tobey, Hubert Earl; Hood, John William; Masiuk, Alphonse Michael; Irvin, Dee Lavern; and Moller, George Otto, to International Telephone and Telegraph Corporation. Method and apparatus for printing on the side of empty boxes. 4,033,254, Cl. 101-44.000.

Toda, Akira: *See—*
Morita, Eiichi; Toda, Akira; Kobayashi, Toru; and Fujii, Hiroshi, 4,033,206, Cl. 82-2.00B.

Toda Kogyo Corporation: *See—*
Matsui, Goro; Toda, Koji; Shimizu, Shigeki; Horiishi, Nanao; and Takedoi, Atushi, 4,033,891, Cl. 252-62.560.

Toda, Koji: *See—*
Matsui, Goro; Toda, Koji; Shimizu, Shigeki; Horiishi, Nanao; and Takedoi, Atushi, 4,033,891, Cl. 252-62.560.

Toi, Toshio, to Nippon Air Brake Company Ltd. Fluid pressure operable servo positioner. 4,033,233, Cl. 91-374.000.

Tokyo Plywood Kabushiki Kaisha: *See—*
Tashiro, Eiji, 4,033,082, Cl. 52-316.000.

Tokyo Shibaura Electric Co., Ltd.: *See—*
Fukuda, Takeo; and Tashiro, Isao, 4,034,364, Cl. 340-347.0NT.
Goto, Eizo, 4,034,330, Cl. 338-238.000.
Kamo, Hisao; Kuroda, Masahiro; and Okano, Susumu, 4,034,394, Cl. 357-15.000.
Kawai, Tsuneo, 4,033,047, Cl. 34-82.000.
Mitsui, Hisayasu; Kamiuchi, Jun-ichi; Kumazawa, Ryozi; Umemoto, Kimikazu; Yamada, Toshimitsu; Yoshida, Katsuhiko; and Takechi, Taichi, 4,033,805, Cl. 156-185.000.
Naito, Makoto; Kawachi, Masaru; Sekiwa, Tetuo; Akatsuka, Minoru; Kasami, Akinobu; and Toyama, Masaharu, 4,033,291, Cl. 118-412.000.
Sano, Shunichi; and Ogawa, Youji, 4,034,324, Cl. 335-212.000.
Takase, Tsuneo; and Yamaguchi, Tetsuo, 4,033,109, Cl. 58-85.500.

Tomilin, Alexandr Grigorievich: *See—*
Dmitriev, Vasily Petrovich; Polyakov, Anatoly Mikhailovich; Tomilin, Alexandr Grigorievich; and Shushpan, Stanislav Mikhailovich, 4,033,116, Cl. 60-39.28R.

Tomioka, Tatsuyuki; Yukami, Noboru; Hamaguchi, Yoshi; and Yamashita, Kiyoharu, to Matsushita Electric Industrial Co., Ltd. Thermal printing head. 4,034,187, Cl. 219-216.000.

Tomisawa, Norio; Uchiyama, Yasuji; Okumura, Takatoshi; and Takeda, Toshio, to Nippon Gakki Seizo Kabushiki Kaisha. Key switch system. 4,033,221, Cl. 84-1.030.

Tomlinson, Barrett L.; and Hill, Howard D. W., to Varian Associates, Inc. Spectrometer means employing linear synthesized RF excitation. 4,034,191, Cl. 235-151.300.

Tomo, Daniel: *See—*
Stiles, Claude J.; and Tomo, Daniel, 4,033,929, Cl. 264-45.900.

Tong, Alvin H.: *See—*
Demsky, Herbert M.; Mathisen, Einar S.; Schumann, Paul A., Jr.; and Tong, Alvin H., 4,033,698, Cl. 356-173.000.

Tooley, Clyde E., to Upjohn Company, The. Pneumatic valve interlock system. 4,033,379, Cl. 137-637.100.

Toombs, Thomas N.: *See—*
Dill, Hans G.; and Toombs, Thomas N., 4,033,797, Cl. 148-187.000.

Toray Silicone Company, Ltd.: *See—*
Mine, Katsutoshi; Nishio, Minoru; and Sumimura, Shinichi, 4,033,924, Cl. 260-37.0SB.

Toriumi, Shiro; Endo, Hiroshi; Ueda, Nobuo; and Yamagishi, Seiichi, to Minolta Camera Kabushiki Kaisha. Microfiche reader means. 4,033,684, Cl. 353-27.00A.

Torok, Ernest J.; Kaske, Alan D.; Krawczak, John A.; and Paul, Maynard C., to Sperry Rand Corporation. Magneto-resistive readout of a cross-tie wall memory system using a pillar and concentric ring probe. 4,034,359, Cl. 340-174.0TF.

Torreggiani, Gianni: *See—*
Cocuzza, Gioacchino; Torreggiani, Gianni; and Sfregola, Michele, 4,033,617, Cl. 203-27.000.

Totuka, Kaoru; Ohwaki, Isao; Ohba, Masahiro; and Nakamura, Shinji,

to Victor Company of Japan, Limited. Record disc cutting stylus. 4,033,592, Cl. 274-38.000.
Toulios, Peter P.: *See—*
Knox, Robert M.; and Toulios, Peter P., 4,034,377, Cl. 343-180.000.
Towler, Martin L.: *See—*
Bracey, Jep T., 4,034,030, Cl. 261-64.00D.
Towmotor Corporation: *See—*
Evans, Dafydd W., 4,033,424, Cl. 180-68.500.
Toy, Arthur D. F.; and Uhing, Eugene H., to Stauffer Chemical Company. Method of preparing trialkyl tetrathiophosphates. 4,034,024, Cl. 260-981.000.
Toyama, Koichi: *See—*
Arai, Hiroshi; Nogami, Takahiro; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,033,634, Cl. 303-103.000.
Toyama, Masaharu: *See—*
Naito, Makoto; Kawachi, Masaru; Sekiwa, Tetuo; Akatsuka, Minoru; Kasami, Akinobu; and Toyama, Masaharu, 4,033,291, Cl. 118-412.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Arai, Hiroshi; Nogami, Takahiro; Sugiura, Akio; Okamoto, Atutoshi; and Toyama, Koichi, 4,033,634, Cl. 303-103.000.
Arai, Hiroshi, 4,034,336, Cl. 340-52.00F.
Inada, Masami; Kawabata, Yasuhiro; and Sato, Katsujiro, 4,033,125, Cl. 60-290.000.
Kuramochi, Kojiro; and Taga, Yutaka, 4,033,146, Cl. 64-23.000.
Maeda, Yorishige, 4,033,196, Cl. 74-242.11R.
Sakai, Ichio, 4,033,201, Cl. 74-869.000.
Shingu, Iichi; Kondo, Yutaka; and Nishina, Shuho, 4,033,610, Cl. 280-737.000.
Tanigawa, Kou; Hashikawa, Kenzo; and Ota, Jun, 4,034,369, Cl. 340-52.00F.
Trelby, Ib Verner, to F. L. Smidth & Co. Rotary drum plant with water introduction system. 4,033,376, Cl. 137-580.000.
Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 4-Morpholino derivatives of pyrazolo[1,5-a]-quinoxaline-3-carboxylic acids and esters. 4,033,958, Cl. 260-247.20B.
Tribotech: *See—*
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,033,641, Cl. 308-15.000.
Trimmer, David G. Beam cutting and mitering device. 4,033,035, Cl. 30-122.000.
Trost, Allen J., to Ampex Corporation. Pilot signal luminance correction means for video recording apparatus. 4,034,397, Cl. 358-8.000.
Troutner, Arthur L., to Trus Joist Corporation. Sequencing die and method for forming truss webs from metal tubing. 4,033,166, Cl. 72-334.000.
Troutner, Arthur L., to Trus Joist Corporation. Apparatus and method for forming planks for use in chord components of integral truss-supported decks. 4,033,391, Cl. 144-321.000.
Trumble, John H.; and Szekely, Akos, to Thermology, Inc. Heat transfer sleeve for chemical heaters. 4,033,323, Cl. 126-263.000.
Trus Joist Corporation: *See—*
Troutner, Arthur L., 4,033,166, Cl. 72-334.000.
Troutner, Arthur L., 4,033,391, Cl. 144-321.000.
TRW Inc.: *See—*
Cronin, Donald L.; Farber, Bertrand F.; Gehm, Hartmut K.; and Goldin, Daniel S., 4,034,280, Cl. 363-25.000.
Hudgens, Bernard C., 4,033,020, Cl. 29-149.5NM.
Olsson, David L., 4,034,319, Cl. 333-73.00R.
White, Peter G., 4,034,190, Cl. 235-151.300.
Tscheulin, Guenther: *See—*
Hofer, Kurt; and Tscheulin, Guenther, 4,033,957, Cl. 260-246.00B.
Tsoi-Hei Ma, Thomas, to Ford Motor Company. Variable venturi carburetor. 4,034,028, Cl. 261-41.00R.
Tsuchiya, Hiroyoshi; Tsuda, Yukifumi; Hayami, Heijiro; and Kotera, Hiroaki, to Matsushita Electric Industrial Co., Ltd. Facsimile signal transmission system. 4,034,406, Cl. 358-260.000.
Tsuda, Takashi: *See—*
Sugiyama, Takashi; and Tsuda, Takashi, 4,034,367, Cl. 340-347.0AD.
Tsuda, Yukifumi: *See—*
Tsuchiya, Hiroyoshi; Tsuda, Yukifumi; Hayami, Heijiro; and Kotera, Hiroaki, 4,034,406, Cl. 358-260.000.
Tsujimoto, Michihiro; Tsukahara, Ryoichi; Nishizawa, Tsutomu; and Okubo, Ichiro, to Mitsui Toatsu Chemicals, Incorporated. Coloring resins by mixing naphthacenequinones therewith. 4,033,923, Cl. 260-37.00N.
Tsukada, Syusei: *See—*
Hirayama, Kazuhiro; Tsukada, Syusei; and Inoue, Takahiro, 4,033,687, Cl. 355-1.000.
Tsukahara, Ryoichi: *See—*
Tsujimoto, Michihiro; Tsukahara, Ryoichi; Nishizawa, Tsutomu; and Okubo, Ichiro, 4,033,923, Cl. 260-37.00N.
Tsunekawa, Tokuichi; Nakamoto, Soichi; and Taguchi, Tetsuya, to Canon Kabushiki Kaisha. Exposure meter circuit of camera with matching network for flash device. 4,034,384, Cl. 354-33.000.
Tuft, Roy E.: *See—*
Strong, Herbert M.; and Tuft, Roy E., 4,034,066, Cl. 423-446.000.
Tuller, Harold W.: *See—*
Curtis, Omer E., Jr.; Tuller, Harold W.; O'Neill, Charles T.; and Nussbaum, Ralph W., 4,034,014, Cl. 260-837.00R.
Tuomy, Justin M.: *See—*
Glickstein, Myer; and Tuomy, Justin M., 4,034,123, Cl. 426-582.000.
Turcotte, Ronald E., to Schlumberger Technology Corporation. Focused detection logging technique. 4,034,218, Cl. 250-269.000.
Turczanski, Henryk: *See—*
Hill, John; and Turczanski, Henryk, 4,034,326, Cl. 337-34.000.
Turrentine, Fred C.: *See—*
Hicks, Prentiss C.; and Turrentine, Fred C., 4,033,481, Cl. 222-134.000.
Twiselton, Steven Glen: *See—*
Rozylowicz, Edward Francis; and Twiselton, Steven Glen, 4,034,289, Cl. 324-95.000.
Tybus, Gerd; Ebner, Ludwig; Waldhoer, Rudolf; Bichler, Peter; Bier, Wilhelm; Happe, Peter; and Weis, Frowald, to Messerschmitt-Bolkow-Blohm GmbH; and Gesellschaft fur Kernforschung m.b.H. Gas separation nozzles and method and apparatus for producing such nozzles. 4,033,021, Cl. 29-157.00C.
Tyrrell, Joseph Leslie: *See—*
Muller, Alex Marcel; and Tyrrell, Joseph Leslie, 4,034,155, Cl. 178-19.000.
Ubukata, Takao: *See—*
Morita, Kouichi; Sekine, Hirohito; and Ubukata, Takao, 4,034,281, Cl. 323-17.000.
Uchiyama, Yasuji: *See—*
Tomisawa, Norio; Uchiyama, Yasuji; Okumura, Takatoshi; and Takeda, Toshio, 4,033,221, Cl. 84-1.030.
Ueda, Nobuo: *See—*
Toriumi, Shiro; Endo, Hiroshi; Ueda, Nobuo; and Yamagishi, Seiichi, 4,033,684, Cl. 353-27.00A.
Uemura, Michihiko; Kanbara, Tohru; and Igarashi, Yutaka, to Asahi Glass Co., Ltd. Ultrasonic delay lines and method of making the same. 4,034,317, Cl. 333-30.00R.
Ueno, Masayuki; and Sano, Fumiaki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Mud gun having clamping device. 4,033,565, Cl. 266-273.000.
Uhing, Eugene H.: *See—*
Toy, Arthur D. F.; and Uhing, Eugene H., 4,034,024, Cl. 260-981.000.
Uhlig, Fritz, to Hoechst Aktiengesellschaft. Process for the production of planographic printing forms by means of laser beams. 4,034,183, Cl. 219-122.0LM.
Ulivi, Moreno, to Saint-Gobain Industries. Manufacture of a window by breaking the edges of a sheet of glass along a score. 4,033,490, Cl. 225-1.000.
Umemoto, Kimikazu: *See—*
Mitsui, Hisayasu; Kamiuchi, Jun-ichi; Kumazawa, Ryozi; Umemoto, Kimikazu; Yamada, Toshimitsu; Yoshida, Katsuhiko; and Takechi, Taichi, 4,033,805, Cl. 156-185.000.
Union Carbide Corporation: *See—*
Eichin, Harry P., 4,033,382, Cl. 138-118.100.
Fernicola, Robert C., 4,034,184, Cl. 219-124.000.
Kasai, Paul Haruo; Francis, James Nelson; and Bishop, Roland Justin, Jr., 4,034,065, Cl. 423-328.000.
Kurtz, Abraham Nathan; Thorsteinson, Erlind Magnus; and Decker, Harry Joe, 4,034,008, Cl. 260-533.00N.
Omietanski, George M.; Furbee, Harold D.; and Chuang, Vincent T., 4,033,990, Cl. 260-448.20B.
Papa, Anthony Joseph, 4,033,909, Cl. 260-2.50F.
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Sandner, Michael Ray; and Prokai, Bela, 4,033,911, Cl. 260-2.5AC.
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Schorsch, John B.; Graul, William E.; and Barash, David, 4,033,142, Cl. 62-381.000.
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Bewley, William L.; and Wilkinson, Herbert F., deceased, 4,033,467, Cl. 214-23.000.
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Young, Donald C., 4,033,746, Cl. 71-30.000.
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Whelan, William Paul, Jr., 4,033,916, Cl. 260-28.50A.
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Bickerdike, Robert Lewis; Clark, Douglas; Eastabrook, John Norman; Hughes, Garyth; Mair, William Norman; Partridge, Peter George; and Ranson, Harry Christopher, 4,033,793, Cl. 148-32.000.
Stangroom, James Edward, 4,033,892, Cl. 252-76.000
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Gregorian, Razmic S.; and Hoernle, Hans R., 4,034,134, Cl. 428-86.000.
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Administrator, Environmental Protection Agency: *See—*
Smith, Richard Dunham, 4,033,117, Cl. 60-39.46S.
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Silverstein, Robert M.; Gore, William E.; Pearce, Glenn T.; Cuthbert, Roy A.; Simeone, John B.; Lanier, Gerald N.; and Peacock, John W., 4,034,080, Cl. 424-84.000.
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Van Etten, Paul; and McNamara, John V., 4,034,363, Cl. 340-347.00P.
Willmore, Robert R., 4,034,156, Cl. 178-22.000.
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Ashley, James R.; Barley, Thomas A.; and Rast, Gustaf J., Jr., 4,034,285, Cl. 324-57.00R.

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Brodman, Bruce W.; Devine, Michael P.; and Schwartz, Stuart, 4,033,798, Cl. 149-92.000.
Glickstein, Myer; and Tuomy, Justin M., 4,034,123, Cl. 426-582.000.
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Wiese, Harold Herman; and Schade, Steven Ray, 4,033,228, Cl. 89-42.00B.

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Hendricks, Charles D., 4,034,032, Cl. 264-28.000.
Holt, Fred E.; Cash, Robert J.; and Schenter, Robert E., 4,033,813, Cl. 176-19.0LD.

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Wadge, James C.; Falvey, Henry T.; and Johnson, Perry L., 4,033,704, Cl. 415-80.000.

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Frost, James D., Jr.; and Hillman, Carl E., Jr. Snap-in compressible biomedical electrode. 4,033,334, Cl. 128-2.10E.
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Clotfelter, Wayman N., 4,033,182, Cl. 73-88.00R.
Luebering, George W., 4,033,705, Cl. 416-220.00R.
Nichols, Mark R., 4,033,119, Cl. 60-226.00R.

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Alpert, Louis, 4,033,659, Cl. 339-60.00R.
Holtrop, John W., 4,033,224, Cl. 89-7.000.
Johnson, Clifford T.; and McCubbin, Melvin J., 4,033,265, Cl. 102-56.0SC.
Kartzmark, Roy M., Jr., 4,033,225, Cl. 89-1.810.
Morris, Joseph W.; Cram, Bryan L.; and Marchese, Vincent P., 4,033,267, Cl. 102-70.00R.
Ruegger, Richard A., 4,033,388, Cl. 140-106.000.

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Aldenhoven, Ghislanus Matheus Antonius Maria, 4,033,491, Cl. 226-11.000.
Bex, Hans, 4,034,316, Cl. 333-11.000.
Bunge, Ernst; Rothgordt, Ulf; Ehlers, Bernd; and Piotrowski, Herbert, 4,033,443, Cl. 197-1.00R.
Butterweck, Hans-Jurgen; Claasen, Theodoor Antonius Carel Maria; Mecklenbrauker, Wolfgang Friedrich Georg; and Peek, Johannes Bernhard Heinrich, 4,034,196, Cl. 235-156.000.
Compaan, Klaas; and Bouwhuis, Gijsbertus, 4,034,403, Cl. 358-128.000.
Deis, August, 4,034,345, Cl. 364-200.000.
Hartog, Jan; and Zwagemakers, Johannes Maria Antonius, 4,034,103, Cl. 424-282.000.
Hermans, Matthias Leonardus, 4,033,130, Cl. 60-523.000.
Janssen, Peter Johannes Hubertus, 4,034,405, Cl. 358-147.000.
Jones, Stewart Barry; and Williams, Keith Rushworth, 4,034,313, Cl. 331-96.000.
King, Hewson Nicholas Graham; Mansell, John Revere; and Stubberfield, Pamela May, 4,034,254, Cl. 313-400.000.
Kowalski, Gunter, 4,034,223, Cl. 250-369.000.
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Samulowitz, Helmut, 4,033,174, Cl. 73-40.000.
Saraga, Peter; and Reijnierse, Pieter, 4,034,344, Cl. 340-146.30H.
van der Burgt, Cornelis Martinus; and Van Maanen, Gerardus Andreas, 4,034,241, Cl. 307-264.000.
Van Gerwen, Petrus Josephus, 4,034,160, Cl. 179-15.55R.

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Bicniosek, Chester E.; Kachik, Robert H.; and Pignocco, Arthur J., 4,033,399, Cl. 164-54.000.
Boodman, Norman S.; and Weil, Richard C., 4,034,048, Cl. 260-621.00H.
Ollis, George E., 4,033,800, Cl. 156-48.000.
Pringle, William L., 4,032,999, Cl. 5-14.000.

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Ambrose, Peter C., Jr.; and Knapp, Ronald F., 4,033,501, Cl. 228-2.000.
Giamei, Anthony F.; and Kear, Bernard H., 4,033,792, Cl. 148-32.000.
Hecht, Ralph Julius, 4,034,142, Cl. 428-678.000.

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Foreman, Gerald E.; and Worsley, Peter K., 4,033,878, Cl. 210-321.00A.
Pulak, Richard P., 4,033,726, Cl. 23-288.00B.

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Friedel, William C., Jr.; Bettencourt, Thomas S.; and Freeman, Daniel L., 4,033,099, Cl. 56-327.00R.

University of Glasgow: *See*—
Jarrett, William Fleming Hoggan; Jarrett, James Oswald; and Mackey, Lindsay Joan, 4,034,081, Cl. 424-89.000.

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Voorhees, John J., 4,034,087, Cl. 424-240.000.

Uno, Keiichi; and Inoue, Mutsuhiro, to Canon Kabushiki Kaisha. Film reader. 4,033,685, Cl. 353-82.000.

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Untch, Karl G.; and Gardner, John O., to Syntex (U.S.A.) Inc. Thiacycl[2.2.2]azine carboxylic acids. 4,033,978, Cl. 260-306.70R.

UOP Inc.: *See*—
Carlson, David H. J., 4,033,860, Cl. 208-206.000.

Upjohn Company, The: *See*—
Bryan, Jack T., 4,034,099, Cl. 424-271.000.
Bundy, Gordon L., 4,033,989, Cl. 260-408.000.
Kelly, Robert C.; and Nelson, Norman A., 4,033,949, Cl. 260-240.00R.
Sekhar, Neel C., 4,033,816, Cl. 195-1.800.
Sun, Kwok K., 4,034,039, Cl. 260-570.00D.
Tooley, Clyde E., 4,033,379, Cl. 137-637.100.

Urakami, Teizi; and Michimi, Reiko, to Mitsubishi Gas Chemical Company, Inc. Process for producing yeast cells. 4,033,821, Cl. 195-49.000.

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Aoyama, Ryozo; Matsuda, Yukinobu; and Urushima, Mitsuo, 4,033,128, Cl. 60-484.000.

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Aramaki, Minoru; and Ushirogouchi, Etsuo, 4,034,068, Cl. 423-465.000.

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Vacth, James E.; and Van Hook, Brewton O., to Westinghouse Electric Corporation. Acceleration aided tracking of a designated target. 4,034,208, Cl. 235-61.50S.

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Riihinen, Kalevi, 4,033,812, Cl. 162-273.000.

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van Dam, Antonius Franciscus, to Lever Brothers Company. Emulsions. 4,034,124, Cl. 426-602.000.

van der Burgt, Cornelis Martinus; and Van Maanen, Gerardus Andreas, to U.S. Philips Corporation. Voltage sensitive trigger circuit. 4,034,241, Cl. 307-264.000.

van der Lely, Cornelis. Tine mounting for rotary harrow including U-shaped recess. 4,033,418, Cl. 172-763.000.

Vandermark, Harold F., to Nu-Concept Computer Systems, Inc. Integrated circuit pack extractor. 4,034,202, Cl. 219-230.000.

Vandervell Products Limited: *See*—
Laithwaite, Eric Roberts, 4,033,398, Cl. 164-49.000.

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Hancock, Allen W., II; and Vanderwerff, William D., 4,034,005, Cl. 260-515.00P.

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Van Gerwen, Petrus Josephus, to U.S. Philips Corporation. System for the transmission of speech signals. 4,034,160, Cl. 179-15.55R.

Vanhelle, Michel E., to Centre Technique Industriel dit: Institut Textile de France; and Etablissement Public dit: Agence Nationale de Valorisation. Method and apparatus for twisting core strands. 4,033,102, Cl. 57-12.000.

Van Hook, Brewton O.: *See*—
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Van Horn, Earl Thomas, to Ralston Purina Company. Product and method for controlling odors. 4,034,078, Cl. 424-76.000.

Van Ike, Clayton. Freeze drying apparatus. 4,033,048, Cl. 34-92.000.

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van Reenen, Jacob Hellmuth. Castrating device. 4,033,352, Cl. 128-306.000.

Van Scott, Eugene J.: *See*—
Yu, Rucy J.; and Van Scott, Eugene J., 4,034,114, Cl. 424-333.000.

Vargo, Donald L.: *See*—
Hopkins, Henry S., Jr.; and Vargo, Donald L., 4,033,908, Cl. 260-2.5AW.

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Gerlach, Robert L.; and Rossini, George D., 4,033,904, Cl. 250-491.000.

Tomlinson, Barrett L.; and Hill, Howard D. W., 4,034,191, Cl. 235-151.300.

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Brodmann, Franz J.; and Varker, Richard D., 4,033,783, Cl. 106-120.000.

Vaughn, Julian Edgar, to International Business Machines Corporation. Apparatus and method for phase synchronization. 4,034,309, Cl. 331-1.00A.

Vautrain, Lucien H., to Phillips Petroleum Company. Separator ring in fixed bed radial flow catalytic reactor. 4,033,727, Cl. 23-288.00R.

VDO Adolf Schindling AG: *See—*
Kreuz, Alois; and Hahn, Joachim, 4,033,191, Cl. 73-431.000.

VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen: *See—*
Johne, Hans; Jentzsch, Arndt; and Schumann, Gunter, 4,033,262, Cl. 101-350.000.
Lein, Werner; Reichenberger, Kurt; and Schanze, Klaus, 4,033,260, Cl. 101-232.000.

Veeder Industries, Inc.: *See—*
Capuano, Terry D., 4,033,394, Cl. 151-21.00C.
Jackson, James J., 4,034,193, Cl. 235-151.340.

Veitscher Magnesitwerke-Actien-Gesellschaft: *See—*
Weiss, Franz; Baumgartner, Friedrich; and Zach, Werner, 4,033,514, Cl. 239-662.000.

Velsicol Chemical Corporation: *See—*
Anderson, Arnold L., 4,033,926, Cl. 260-45.75B.
Anderson, Arnold L., 4,033,931, Cl. 260-45.75R.
Anderson, Arnold L., 4,033,932, Cl. 260-45.75B.
Krenzer, John, 4,033,753, Cl. 71-94.000.

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Hoppe, William C.; and Hanson, Theodore L., 4,033,477, Cl. 221-114.000.

Venus, James; Charlton, David, deceased; and by Charlton, Martha, administratrix. Sand and gravel dredges. 4,033,470, Cl. 214-152.000.

Verbickas, Robert C., to Fenn Manufacturing Company, The. Mechanism for adjustably positioning planetary machining elements. 4,033,075, Cl. 51-80.00A.

Vermeulen, Leon Louis: *See—*
De Haes, Louis Maria; Vermeulen, Leon Louis; Gevers, Hugo Karel; and De Winter, Walter Frans, 4,033,770, Cl. 96-28.000.

Verrier, Jean: *See—*
Coquard, Jean; Sedivy, Pierre; Ruaud, Michel; and Verrier, Jean, 4,032,993, Cl. 3-1.000.

Vetter, Arthur, to Multivac Sepp Haggenmueller KG. Vacuum packaging machine for the production of packages from packaging material webs. 4,033,092, Cl. 53-112.00A.

Vickers Limited: *See—*
Lawson, Leslie Edward, 4,033,919, Cl. 260-29.6TA.

Victor Company of Japan, Limited: *See—*
Totuka, Kaoru; Ohwaki, Isao; Ohba, Masahiro; and Nakamura, Shinji, 4,033,592, Cl. 274-38.000.

Vincolese, George J.: *See—*
Hrdlicka, Eugene R.; Vincolese, George J.; and Szuberla, John H., 4,034,157, Cl. 179-1.0PC.

Virani, Gopal J.; and Misencik, John J., to Westinghouse Electric Corporation. Electric wall receptacle with ground fault protection. 4,034,266, Cl. 361-42.000.

Visagie, Gerhardus Johannes Cornelius. Article of furniture. 4,034,200, Cl. 219-218.000.

Voegeli, Otto: *See—*
Mehta, Kay Beharat; and Voegeli, Otto, 4,034,357, Cl. 340-174.0TF.

Vogel, Paul W., to Lubrizol Corporation, The. Boron-containing esters. 4,034,038, Cl. 260-462.00R.

Vogt, B. Richard, to E. R. Squibb & Sons, Inc. 1H-s-triazolo[4,3-a][1,5]benzodiazepin-1,5(6H)-diones. 4,033,947, Cl. 260-239.30T.

Vogt, Berthold Richard: *See—*
Hoehn, Hans; Bernstein, Jack; and Vogt, Berthold Richard, 4,033,970, Cl. 260-293.610.

Voigt, John E.: *See—*
Bovier, Edward M.; and Voigt, John E., 4,033,914, Cl. 260-17.200.

Volkswagenwerk Aktiengesellschaft: *See—*
Sorgatz, Ulrich; and Kogge, Hans-Jurgen, 4,033,642, Cl. 308-26.000.

Volpe, Anthony R.: *See—*
Warren, William C.; Volpe, Anthony R.; and Rustogi, Kedar N., 4,033,008, Cl. 15-167.00R.

Volpe, Vincent F.: *See—*
Middleton, Charles G.; and Volpe, Vincent F., 4,033,494, Cl. 226-83.000.

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Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,033,967, Cl. 260-287.0CF.
Rhomberg, Alfred; Berger, Herbert; Stach, Kurt, deceased; Plattner, Werner, administrator; Vomel, Wolfgang; and Sauer, Winfriede, 4,034,096, Cl. 424-258.000.

von Bonin, Wulf: *See—*
Kleimann, Helmut; and von Bonin, Wulf, 4,033,912, Cl. 260-2.5AH.

von Strandtmann, Max: *See—*
Cohen, Marvin P.; Shavel, John, Jr.; and von Strandtmann, Max, 4,033,845, Cl. 260-240.00D.

Voorhees, John J., to University of Michigan, The Regents of the. Pharmaceutical composition and process of treatment. 4,034,087, Cl. 424-240.000.

Vradenburg, Dave W.: *See—*
Bezzerides, Paul A.; Bezzerides, Robert A.; and Vradenburg, Dave W., 4,033,270, Cl. 111-6.000.

Vukoje, Tatjana, to Akzona Incorporated. Process and apparatus for producing a variable diameter alternate twist yarn. 4,033,103, Cl. 57-34.0HS.

Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstvi of Czechoslovakia: *See—*
Mureso, Vladimir, 4,033,148, Cl. 66-50.00R.

W. A. Whitney Corporation: *See—*
Brolund, Theodore F.; and Helgert, James F., 4,033,216, Cl. 83-413.000.

W. R. Chesnut Engineering, Inc.: *See—*
Chesnut, W. Richard; and Calligaro, Daniel, 4,033,522, Cl. 242-75.400.

W. R. Grace & Co.: *See—*
Nickell, Louis G., 4,033,755, Cl. 71-113.000.
Rogers, Austin S., 4,033,413, Cl. 166-301.000.
Wortham, Joseph Sidney; and Johnson, Ernest Carlisle, 4,034,120, Cl. 426-531.000.

W. Schlafhorst & Co.: *See—*
Kamp, Heinz, 4,033,104, Cl. 57-34.00R.

Wachtel, Stephen J.: *See—*
Holloway, Richard L.; Edison, Robert R.; and Wachtel, Stephen J., 4,033,861, Cl. 208-211.000.

Wacker-Chemie GmbH: *See—*
Dempf, Dominik; Fruhwirth, Otto; and Schmidhammer, Ludwig, 4,034,051, Cl. 260-652.50R.

Wada, Keisuke: *See—*
Onoda, Takeru; and Wada, Keisuke, 4,033,999, Cl. 260-488.0CD.

Wade, Kenneth Robinson, to Product Automation and Control Limited. Circuits. 4,034,235, Cl. 307-117.000.

Wadge, James C.; Falvey, Henry T.; and Johnson, Perry L., to United States of America, Interior. Destratification device. 4,033,704, Cl. 415-80.000.

Wagenseil, Ludwig, to Hydromatik GmbH. Axial piston machine with a tiltable, revolving cylinder drum. 4,033,238, Cl. 91-505.000.

Wagensonner, Eduard; and Wilsch, Herbert, to AGFA-Gevaert, Aktiengesellschaft. Structure for synchronous motor, especially stepper motor. 4,034,247, Cl. 310-164.000.

Wagner, Richard Siegfried: *See—*
Alexander, Frank Bernard, Jr.; Capio, Cesar Deduyo; Hauser, Victor Emerald, Jr.; Levinstein, Hyman Joseph; Mogab, Cyril Joseph; Sinha, Ashok Kumar; and Wagner, Richard Siegfried, 4,033,287, Cl. 118-49.10R.

Waldhoer, Rudolf: *See—*
Tybus, Gerd; Ebner, Ludwig; Waldhoer, Rudolf; Bichler, Peter; Bier, Wilhelm; Happe, Peter; and Weis, Frowald, 4,033,021, Cl. 29-157.00C.

Walker, Frederick J.: *See—*
Rolt, Anthony P. R.; and Walker, Frederick J., 4,033,636, Cl. 303-114.000.

Walker, James Edwin. Fluid sheet solar collector. 4,033,325, Cl. 126-271.000.

Wall, Frederick, to Paddock of California, Inc. Integrated monitor and control system for continuously monitoring and controlling pH and free halogen in swimming pool water. 4,033,871, Cl. 210-96.00R.

Wallin, Erik W., to Barracudaverken Aktiebolag. Laminated camouflage material. 4,034,375, Cl. 343-18.00A.

Walter, Henry J.; and Kunz, Raymond W., to Clairol Incorporated. Steam curling iron having interchangeable hair winding mandrels. 4,034,201, Cl. 219-222.000.

Walton, Erlen B., to Eaton Corporation. Fluid distributor logic. 4,033,301, Cl. 123-32.00G.

Walton, Erlen B., to Eaton Corporation. Metering control. 4,033,314, Cl. 123-139.00R.

Waly, Adnan, to Personal Communications, Inc. Micro-image records. 4,033,686, Cl. 353-120.000.

Ward, James C.; and Davis, Robert Wayne, to Reyco Industries, Inc. Vehicle tandem suspensions. 4,033,606, Cl. 280-682.000.

Ward, James H., Jr.; and Medley, Max W., Jr., to E-Systems, Inc. Method and apparatus for microstrip termination. 4,034,321, Cl. 333-84.00M.

Ward, William W.: *See—*
Hamell, Matthew; Stefanucci, Arthur; and Ward, William W., 4,034,116, Cl. 426-131.000.

Warn Industries, Inc.: *See—*
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Warner, Allan S. Termination system for fusing aluminum-type lead wires. 4,034,152, Cl. 174-94.00R.

Warner, D. T. Lift truck. 4,033,471, Cl. 214-671.000.

Warner, John C., to Borg-Warner Corporation. Constant angular velocity joint. 4,033,145, Cl. 64-21.000.

Warner-Lambert Company: *See—*
Cohen, Marvin P.; Shavel, John, Jr.; and von Strandtmann, Max, 4,033,845, Cl. 260-240.00D.
Schwender, Charles F.; and Sunday, Brooks R., 4,033,961, Cl. 260-251.00A.
Stoss, Peter; and Satzinger, Gerhard, 4,033,981, Cl. 260-327.00M.

Warren, Dorothy L., executrix: *See—*
Warren, Robert A., deceased, 4,034,290, Cl. 324-110.000.

Warren, Robert A., deceased (by Warren, Dorothy L., executrix), to Westinghouse Electric Corporation. Electrical meter assembly hav-

ing displaced meter and socket terminals. 4,034,290, Cl. 324-110.000.
Warren, William C.; Volpe, Anthony R.; and Rustogi, Kedar N., to Colgate-Palmolive Company. Toothbrush. 4,033,008, Cl. 15-167.00R.
Wasco Products, Inc.: *See—*
Jentoft, Arthur P.; and Couture, Paul A., 4,033,246, Cl. 98-42.00R.
Washio, Takaji; Sasaki, Koichi; and Aizawa, Tatsuo, to Mita Industrial Company, Ltd. Compact optical system for an electrostatic photographic copying apparatus. 4,033,689, Cl. 355-8.000.
Watanabe, Akio: *See—*
Kunioka, Kazuo; Kurihara, Kiwami; Sakaegawa, Koji; Ohsumi, Atushi; Watanabe, Akio; and Sakai, Kenichi, 4,033,737, Cl. 62-64.000.
Watanabe, Akira; and Harada, Saburo, to Kabushiki Kaisha Seikosha; and Koto Denki Kabushiki Kaisha. Manufacturing method of a hermetically sealed terminal. 4,033,017, Cl. 29-25.350.
Watanabe, Itaru: *See—*
Koshiga, Fusao; Tanaka, Jinkichi; and Watanabe, Itaru, 4,034,179, Cl. 219-74.000.
Watanabe, Tadashi: *See—*
Isozaki, Osamu; Watanabe, Tadashi; and Sakamoto, Masahiro, 4,033,920, Cl. 260-29.60H.
Waters, David Martin: *See—*
Bays, David Edmund; Peel, Mervyn Evan; Waters, David Martin; and Ellis, Gwynn Pennant, 4,034,075, Cl. 424-45.000.
Waters, Kenneth H., to Continental Oil Company. Apparatus for controlling lateral positioning of a marine seismic cable. 4,033,278, Cl. 114-245.000.
Watson, Harry W. Boat Guide. 4,033,600, Cl. 280-414.00R.
Watson, Hugh R.; Rowsell, David G.; and Browning, John H. D., to Wilkinson Sword Limited. Substituted p-menthanes. 4,033,994, Cl. 260-468.00R.
Watson, James C.: *See—*
Duffy, James J.; Carlson, Richard D.; and Watson, James C., 4,034,141, Cl. 428-473.000.
Watts, Brian Michael: *See—*
Stowell, Michael James; Watts, Brian Michael; Emley, Edward Frederick; and Grimes, Roger, 4,033,794, Cl. 148-32.000.
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B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 376,749	4,014,856	Mar. 30, 1976	Mar. 29, 1977
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 380,137	4,014,802	Mar. 23, 1976	Mar. 29, 1977
B 381,006	4,009,447	Apr. 6, 1976	Feb. 22, 1977
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,157	4,013,714	Mar. 23, 1976	Mar. 22, 1977
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,2o7	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1975
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 5TH DAY OF JULY, 1977

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Davidson, William J.: *See*—
Innes, Ian R.; and Davidson, William J., T960,003, Cl. 424-337.000.

Innes, Ian R.; and Davidson, William J. Alleviation of tissue damage with bis(substitutedphenyl)mercaptoles. T960,003, 7-5-77, Cl. 424-337.000.

Knight, George R. Culvert construction. T960,001, 7-5-77, Cl. 61-16.000.

Moon, Roger A. Fuel enrichment control circuit for an internal combustion engine. T960,002, 7-5-77, Cl. 123-32.0EA.

Neville, Garth Emanuel. Apparatus for concurrent measurement of polymer melt. T960,004, 7-5-77, Cl. 73-55.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 5TH DAY OF JULY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Ansonia Clock Company, Inc.: *See*—
Nofziger, Dale, Re. 29,290, Cl. 116-124.00R.

Ball Brothers Research Corporation: *See*—
Krutsinger, Jack K.; Bullai, Carl N.; and Munson, Robert E., Re. 29,296, Cl. 343-700.0MS.

Bullai, Carl N.: *See*—
Krutsinger, Jack K.; Bullai, Carl N.; and Munson, Robert E., Re. 29,296, Cl. 343-700.0MS.

Burlington Industries, Inc.: *See*—
Illman, Walter F.; Malpass, Robert C.; and Conklin, Delano M., Re. 29,287, Cl. 28-178.000.

Capetti, Federico: *See*—
Terzuolo, Giancarlo; and Capetti, Federico, Re. 29,289, Cl. 101-232.000.

Caterpillar Tractor Co.: *See*—
Ehlke, Charles C.; Strohschein, Donald K.; and Yancey, John W., Re. 29,293, Cl. 192-13.00R.

Chemical Instruments Corporation: *See*—
Schilling, Robert G., Jr., Re. 29,288, Cl. 73-101.000.

Conklin, Delano M.: *See*—
Illman, Walter F.; Malpass, Robert C.; and Conklin, Delano M., Re. 29,287, Cl. 28-178.000.

Ehlke, Charles C.; Strohschein, Donald K.; and Yancey, John W., to Caterpillar Tractor Co. Pedal actuated steering clutch and brake controls for tractors. Re. 29,293, Cl. 192-13.00R.

Illman, Walter F.; Malpass, Robert C.; and Conklin, Delano M., to Burlington Industries, Inc. Apparatus for applying hot melt size material to textile yarns. Re. 29,287, Cl. 28-178.000.

Krutsinger, Jack K.; Bullai, Carl N.; and Munson, Robert E., to Ball Brothers Research Corporation. Dual slot microstrip antenna device. Re. 29,296, Cl. 343-700.0MS.

Malpass, Robert C.: *See*—
Illman, Walter F.; Malpass, Robert C.; and Conklin, Delano M., Re. 29,287, Cl. 28-178.000.

Munson, Robert E.: *See*—
Krutsinger, Jack K.; Bullai, Carl N.; and Munson, Robert E., Re. 29,296, Cl. 343-700.0MS.

Nofziger, Dale, to Ansonia Clock Company, Inc. Pendulum and escapement anchor relationship indicator and setter. Re. 29,290, Cl. 116-124.00R.

Peak, Leonard R. Portable animal feed bunk and method of feeding stacked or baled hay. Re. 29,291, Cl. 119-60.000.

Pierre, Marcel J., to Societe Materiel pour Toutes Applications Plastiques - M.A.P. Press for moulding gramophone records or the like. Re. 29,294, Cl. 425-590.000.

Schilling, Robert G., Jr., to Chemical Instruments Corporation. Material analyzing apparatus and method. Re. 29,288, Cl. 73-101.000.

Societa Nebiolo S.p.A.: *See*—
Terzuolo, Giancarlo; and Capetti, Federico, Re. 29,289, Cl. 101-232.000.

Societe Materiel pour Toutes Applications Plastiques - M.A.P.: *See*—
Pierre, Marcel J., Re. 29,294, Cl. 425-590.000.

Strohschein, Donald K.: *See*—
Ehlke, Charles C.; Strohschein, Donald K.; and Yancey, John W., Re. 29,293, Cl. 192-13.00R.

Sundstrand Corporation: *See*—
Tennis, Francis H., Re. 29,292, Cl. 137-596.000.

Tennis, Francis H., to Sundstrand Corporation. Control valve means for fluid motors. Re. 29,292, Cl. 137-596.000.

Terzuolo, Giancarlo; and Capetti, Federico, to Societa Nebiolo S.p.A. Printing press with variable speed transfer cylinder. Re. 29,289, Cl. 101-232.000.

Yancey, John W.: *See*—
Ehlke, Charles C.; Strohschein, Donald K.; and Yancey, John W., Re. 29,293, Cl. 192-13.00R.

LIST OF PLANT PATENTEES

Cerro Gordo, Inc.: *See*—
Ito, Tokuyasu; and Ikuta, Hideo, 4,069, Cl. 88.000.

Ikuta, Hideo: *See*—
Ito, Tokuyasu; and Ikuta, Hideo, 4,069, Cl. 88.000.

Ito, Tokuyasu; and Ikuta, Hideo, to Cerro Gordo, Inc. Rubber plant (Ficus Gold King). 4,069, 7-5-77, Cl. 88.000.

Kono, Yoshio. Clear Yellow May Shoesmith. 4,071, 7-5-77, Cl. 78.000.

Mikkelsens Inc.: *See*—
Woodriff, Leslie, 4,073, Cl. 68.000.

Moore, Ralph S. Rose plant. 4,070, 7-5-77, Cl. 9.000.

Nakayama, Hitoshi P. Peach tree. 4,072, 7-5-77, Cl. 43.000.

Woodriff, Leslie, to Mikkelsens Inc. Begonia plant. 4,073, 7-5-77, Cl. 68.000.

LIST OF DESIGN PATENTEES

Adams, Ruey C., to Cosco, Inc. Playpen. 244,890, 7-5-77, Cl. D6-13.000.

AMP Incorporated: *See—*
Brunner, Richard Roy; and Boenzli, Gabriel, 244,904, Cl. D8-58.000.
Hooper, Dean Roosevelt, Jr., 244,944, Cl. D13-24.000.

Anthon, Edmund H., III. Motorcycle utility box. 244,927, 7-5-77, Cl. D12-158.000.

Armstrong, Robert H. Combined liquid dispenser and mounting bracket. 244,929, 7-5-77, Cl. D15-112.000.

Ballert Orthopedic Corporation: *See—*
Perser, Donald A.; and Cook, Michael Franz Helmut, 244,886, Cl. D2-264.000.

Balmer, James G., Jr., to Xerox Corporation. Film reel. 244,943, 7-5-77, Cl. D14-10.000.

Bear Co., Ltd.: *See—*
Ueno, Naohiro, 244,916, Cl. D10-38.000.

Beatrice Goods Co.: *See—*
Chow, Ho, 244,936, Cl. D23-7.000.

Beautiline Systems Limited: *See—*
Bobrovniczky, Bertalan Tamas, 244,942, Cl. D25-75.000.

Bergo, Ralph M.: *See—*
Hauser, Stephen G.; Keith, Keith S.; Bergo, Ralph M.; and DiSorbo, Robert T., 244,934, Cl. D16-14.000.

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443	4,033,198
594.6	4,033,199
740	4,033,200
866	4,033,202
869	4,033,201
	4,033,203

CLASS 75

10 R	4,033,757
67 R	4,033,758
	4,033,759
68 R	4,033,760
77	4,033,761
96	4,033,762
97 R	4,033,763
108	4,033,765
123 CB	4,033,766
170	4,033,767

CLASS 76

101 A	4,033,204

CLASS 81

3.42	4,033,205

CLASS 82

2 B	4,033,206
2 E	4,033,207
4 C	4,033,208
8	4,033,209
31	4,033,210
33 R	4,033,211

CLASS 83

13	4,033,212
56	4,033,213
174	4,033,214
204	4,033,215
413	4,033,216
425.4	4,033,217
478	4,033,218

CLASS 84

1.03	4,033,219
	4,033,220
	4,033,221

CLASS 85

4	4,033,243
45	4,033,244
72	4,033,222
83	4,033,223

CLASS 89

1.5 F	4,033,226
1.81	4,033,225
7	4,033,224
34	4,033,227
42 B	4,033,228

CLASS 90

12 R	4,033,229
13.4	4,033,230
24.3	4,033,231

CLASS 91

47	4,033,232
374	4,033,233
384	4,033,234
396	4,033,235
463	4,033,236
484	4,033,237
505	4,033,238

CLASS 92

58	4,033,239

CLASS 93

36 A	4,033,240
39.1 R	4,033,241
51 R	4,033,242

CLASS 96

1.5	4,033,768
	4,033,769
28	4,033,770
60 BF	4,033,771
114	4,033,772
115 P	4,033,773

CLASS 98

2.12	4,033,245
42 R	4,033,246
119	4,033,247

CLASS 99

281	4,033,248

CLASS 100

3	4,033,249
53	4,033,250
95	4,033,251
99	4,033,252
118	4,033,253

CLASS 101

44	4,033,254
93.04	4,033,255
99	4,033,256
111	4,033,257
158	4,033,258
174	4,033,259
232	Re.29,289
	4,033,260
248	4,033,261
350	4,033,262
416 A	4,033,263

CLASS 102

24 R	4,033,264
56 SC	4,033,265
70 R	4,033,267
70.2 R	4,033,266

CLASS 105

497	4,033,268

CLASS 106

35	4,033,774
39.7	4,033,775
46	4,033,776
52	4,033,777
58	4,033,778
62	4,033,779
69	4,033,780
90	4,033,781
104	4,033,782
120	4,033,783

CLASS 110

160	4,033,269

CLASS 111

6	4,033,270
7	4,033,271

CLASS 112

274	4,033,273

CLASS 113

120 A	4,033,274
121 C	4,033,275

CLASS 114

190	4,033,276
230	4,033,277
243	4,033,279
245	4,033,278
255	4,033,280
295	4,033,281

CLASS 115

17	4,033,282

CLASS 116

124 R	Re.29,290

CLASS 118

1	4,033,283
3	4,033,284
4	4,033,285
49	4,033,286
49.1 R	4,033,287
52	4,033,288
227	4,033,289
266	4,033,290
412	4,033,291
629	4,033,292
653	4,033,293
658	4,033,294

CLASS 119

14.44	4,033,295
23	4,033,296
60	Re.29,291

CLASS 122

476	4,033,297
510	4,033,298

CLASS 123

8.43	4,033,299
8.45	4,033,300
32 G	4,033,301
41.85	4,033,303
59 BM	4,033,302
78 A	4,033,304
117 D	4,033,305
117 R	4,033,272
119 A	4,033,306
	4,033,307
	4,033,308
	4,033,309
139 AP	4,033,310
139 R	4,033,314
146.5 A	4,033,315
148 E	4,033,316
179 K	4,033,311
190 D	4,033,317
196 R	4,033,312

CLASS 124

7 4,033,318
17 4,033,313

CLASS 125

13 R 4,033,319

CLASS 126

110 R 4,033,320
198 4,033,321
200 4,033,322
263 4,033,323
270 4,033,324
271 4,033,325
4,033,326
4,033,327
343.5 A 4,033,328

CLASS 128

2 G 4,033,330
2 M 4,033,331
2 S 4,033,329
4,033,332
2.05 C 4,033,337
2.05 R 4,033,335
4,033,336
2.06 E 4,033,333
2.1 E 4,033,334
36 4,033,338
68 4,033,339
92 A 4,033,340
132 D 4,033,341
140 N 4,033,342
145.8 4,033,343
214 R 4,033,344
4,033,345
223 4,033,346
227 4,033,347
287 4,033,348
303 R 4,033,349
303.13 4,033,350
303.14 4,033,351
306 4,033,352
351 4,033,353
379 4,033,354
404 4,033,355
405 4,033,356
418 4,033,357

CLASS 131

15 R 4,033,358
17 AC 4,033,359
21 B 4,033,360
262 A 4,033,361
264 4,033,362

CLASS 132

73.5 4,033,363
88.5 4,033,364
89 4,033,365

CLASS 134

15 4,033,785
20 4,033,784

CLASS 135

2 4,033,366
8 4,033,367

CLASS 137

54 4,033,368
68 R 4,033,369
100 4,033,370
4,033,371
296 4,033,372
454.6 4,033,373
461 4,033,374
493.9 4,033,375
580 4,033,376
596 Re.29,292
4,033,377
614.19 4,033,378
637.1 4,033,379

CLASS 138

96 T 4,033,380
113 4,033,381
118.1 4,033,382
149 4,033,383

CLASS 139

452 4,033,384

CLASS 140

92.1 4,033,385
4,033,386
105 4,033,387
106 4,033,388

CLASS 141

207 4,033,389

CLASS 144

193 D 4,033,390
321 4,033,391

CLASS 148

1.5 4,033,786
4,033,787
4,033,788
12 F 4,033,789
22 4,033,790
31.55 4,033,791
32 4,033,792
4,033,793
4,033,794
108 4,033,795
175 4,033,796
187 4,033,797

CLASS 149

92 4,033,798
120 4,033,799

CLASS 150

52 J 4,033,392

CLASS 151

14.5 4,033,393
21 C 4,033,394

CLASS 152

323 4,033,395

CLASS 156

48 4,033,800
70 4,033,801
71 4,033,802
4,033,803
84 4,033,804
185 4,033,805
211 4,033,806
384 4,033,807
425 4,033,808
572 4,033,809
656 4,033,810

CLASS 160

332 4,033,396
393 4,033,397

CLASS 162

17 4,033,811
273 4,033,812

CLASS 164

49 4,033,398
54 4,033,399
98 4,033,400
121 4,033,401
150 4,033,402
155 4,033,403
260 4,033,404
278 4,033,405

CLASS 165

32 4,033,406
95 4,033,407

CLASS 166

75 R 4,033,408
117.5 4,033,409
244 C 4,033,410
257 4,033,411
267 4,033,412
301 4,033,413
4,033,414
308 4,033,415

CLASS 172

61 4,033,416
613 4,033,417
763 4,033,418

CLASS 173

34 4,033,419

CLASS 174

14 R 4,034,147
34 4,034,148
68.5 4,034,149
69 4,034,150
73 R 4,034,151
94 R 4,034,152
120 SR 4,034,153
127 4,034,154

CLASS 176

19 LD 4,033,813
63 4,033,814
87 4,033,815

CLASS 177

126 4,033,420

CLASS 178

19 4,034,155
22 4,034,156

CLASS 179

1 GQ 4,034,158
1 PC 4,034,157
15 AT 4,034,159
15.55 R 4,034,160
18 AB 4,034,161
4,034,162
90 CS 4,034,163
100.11 4,034,164
115.5 R 4,034,165
170 NC 4,034,166
178 4,034,167

CLASS 180

8 A 4,033,421
14 C 4,033,422
41 4,033,423
68.5 4,033,424
77 R 4,033,425
79.1 4,033,426
140 4,033,427

CLASS 181

36 C 4,033,428
106 4,033,429
144 4,033,430
152 4,033,431

CLASS 184

1.5 4,033,432

CLASS 188

25 4,033,433
75 4,033,434
173 4,033,435

CLASS 191

2 4,034,168

CLASS 192

3.3 4,033,436
13 R Re.29,293
53 F 4,033,437
84 A 4,033,438
85 AA 4,033,439
98 4,033,440

CLASS 193

38 4,033,441

CLASS 194

17 4,033,442

CLASS 195

1.8 4,033,816
2 4,033,817
7 4,033,818
29 4,033,819
31 R 4,033,820
49 4,033,821
68 4,033,822
80 R 4,033,823
99 4,033,824
127 4,033,825
139 4,033,826

CLASS 197

1 R 4,033,443
4,033,444
151 4,033,445
157 4,033,446

CLASS 198

441 4,033,447
465 4,033,448
520 4,033,449
648 4,033,450
815 4,033,451

CLASS 200

50 A 4,034,169
4,034,170
51 R 4,034,171
51.1 4,034,172
80 R 4,034,173
81.9 R 4,034,174
150 R 4,034,175
159 B 4,034,176
159 R 4,034,177
293 4,034,178

CLASS 202

248 4,033,827
4,033,828

CLASS 203

9 4,033,829
27 4,033,617

CLASS 204

1 T 4,033,830
11 4,033,831
15 4,033,832
4,033,833
4,033,834
43 S 4,033,835
67 4,033,836
98 4,033,837
103 4,033,838
108 4,033,839
159.17 4,033,840
180 P 4,033,842
180 R 4,033,841
192 P 4,033,843
224 R 4,033,844
247 4,033,846
250 4,033,847
284 4,033,848
286 4,033,849
301 4,033,850
302 4,033,851

CLASS 206

.83 4,033,452
217 4,033,453
347 4,033,456
386 4,033,454
390 4,033,457
391 4,033,455

CLASS 208

8 4,033,852
11 LE 4,033,853
14 4,033,854
25 4,033,855
102 4,033,856
4,033,857
115 4,033,858
179 4,033,859
206 4,033,860
211 4,033,861

CLASS 209

11 4,033,458
73 4,033,862
159 4,033,863
223 R 4,033,864
275 4,033,865

CLASS 210

28 4,033,867
38 C 4,033,868
42 S 4,033,866
65 4,033,869
90 4,033,870
96 R 4,033,871
168 4,033,872
186 4,033,873
189 4,033,874
197 4,033,875
242 S 4,033,876
304 4,033,877
321 A 4,033,878
369 4,033,879
424 4,033,880
491 4,033,881

CLASS 211

20 4,033,459
60 SK 4,033,460
86 4,033,461
94 4,033,462

CLASS 214

1 H 4,033,463
10.5 R 4,033,464
13 4,033,465
17 CB 4,033,466
23 4,033,467
130 R 4,033,468
131 A 4,033,469
152 4,033,470
671 4,033,471

CLASS 215

256 4,033,472

CLASS 219

74 4,034,179
85 BM 4,034,180
121 EM 4,034,181
4,034,182
122 LM 4,034,183
124 4,034,184
212 4,034,185
216 4,034,186
4,034,187
4,034,188
4,034,189
218 4,034,200
222 4,034,201
230 4,034,202
272 4,034,203
368 4,034,204
385 4,034,205
464 4,034,206
517 4,034,207

CLASS 220

66 4,033,473
75 4,033,474
202 4,033,475
334 4,033,476

CLASS 221

114 4,033,477
279 4,033,478

CLASS 222

61 4,033,479
129 4,033,480
134 4,033,481
136 4,033,482
145 4,033,483
146 HE 4,033,484
4,033,485
190 4,033,486
207 4,033,487

CLASS 224

5 V 4,033,488
48 C 4,033,489

CLASS 225

1 4,033,490

CLASS 226

11 4,033,491
25 4,033,492
81 4,033,493
83 4,033,494
157 4,033,560
186 4,033,495
188 4,033,496
194 4,033,497

CLASS 227

30 4,033,498
120 4,033,499
131 4,033,500

CLASS 228

2 4,033,501
56 4,033,502
124 4,033,503
190 4,033,504

CLASS 235

61.12 N 4,034,210
4,034,211
61.5 S 4,034,208
61.9 R 4,034,209
151.1 4,034,212
151.11 4,034,192
151.3 4,034,190
4,034,191
151.34 4,034,193
153 AC 4,034,194
4,034,195
156 4,034,196
4,034,197
164 4,034,198
193 4,034,199

CLASS 236

15 BD 4,033,505

CLASS 239

15 4,033,506
102 4,033,507
177 4,033,508
226 4,033,509
230 4,033,510
346 4,033,511
423 4,033,512
585 4,033,513
662 4,033,514

CLASS 240

6.4 G 4,034,213
10 L 4,034,215
70 4,034,214
78 F 4,034,216
103 R 4,034,217

CLASS 241

27 4,033,515
30 4,033,516
46.11 4,033,517
47 4,033,518

CLASS 242

18 A 4,033,519
43 R 4,033,520
56 A 4,033,521
75:4 4,033,522
198 4,033,523

CLASS 244

3.15 4,033,525
15 4,033,526
99 4,033,527
139 4,033,528
151 B 4,033,529
158 4,033,524

CLASS 248

4 4,033,530
16 4,033,531
17 4,033,532
49 4,033,534
56 4,033,535
160 4,033,536
165 4,033,537
214 4,033,538
228 4,033,539
246 4,033,540
358 AA 4,033,542
358 R 4,033,533
4,033,541
412 4,033,543

CLASS 249

40 4,033,544
98 4,033,545
174 4,033,546
193 4,033,547
194 4,033,548

CLASS 250

199 4,033,882
231 SE 4,033,883
269 4,034,218
301 4,034,219
310 4,034,220
324 4,034,221
355 4,034,222
369 4,034,223
439 P 4,034,224
471 4,034,225
491 4,033,904
493 4,034,226
496 4,033,884
4,033,885
507 4,034,227
511 4,034,228
541 4,034,229
568 4,034,230

CLASS 251

86 4,033,549
328 4,033,550

CLASS 252

8.5 A 4,033,893
34.7 4,033,886
49.8 4,033,887
56 D 4,033,888
4,033,889
62.1 L 4,033,890
62.56 4,033,891
76 4,033,892
99 4,033,894
106 4,033,895
389 A 4,033,896
408 4,033,897
416 4,033,898
420 4,033,899
431 L 4,033,900
432 4,033,901
441 4,033,902
476 4,033,903
500 4,033,905
519 4,033,906

CLASS 254

134.3 R 4,033,551
166 4,033,552
185 B 4,033,553
4,033,554

CLASS 259

4 R 4,033,555
191 4,033,556
192 4,033,557

CLASS 260

2.3 4,033,907
2.5 AC 4,033,911
2.5 AH 4,033,912
2.5 AW 4,033,908
2.5 F 4,033,909
4,033,910
17 R 4,033,913
17.2 4,033,914
28.5 A 4,033,915
4,033,916
29.2 N 4,033,917
29.6 H 4,033,920
4,033,921
29.6 RW 4,033,922
29.6 TA 4,033,919
29.6 WB 4,033,918
33.6 UA 4,033,983
37 N 4,033,923
37 SB 4,033,924
42.53 4,033,925
45.7 P 4,033,927
45.75 B 4,033,926
4,033,932
45.75 R 4,033,931
45.8 N 4,033,928
45.85 R 4,033,933
45.9 R 4,033,930
46.5 G 4,033,934
67.6 R 4,033,935
75 P 4,033,936
77.5 NC 4,033,937
78.3 R 4,033,938
112.5 R 4,033,941
112.5 S 4,033,940
145 A 4,033,942
153 4,033,943
4,033,944
157 4,033,945
166 4,033,946
239.3 T 4,033,947
240 A 4,033,948

240 D 4,033,845
240 R 4,033,949
243 C 4,033,950
4,033,956
243 R 4,033,951
4,033,952
4,033,953
4,033,954
4,033,955
246 B 4,033,957
247.2 B 4,033,958
248 C 4,033,959
250 QN 4,033,960
251 A 4,033,961
256.4 C 4,033,963
256.4 N 4,033,962
268 C 4,033,964
279 R 4,033,965
286 Q 4,033,966
287 CF 4,033,967
288 CF 4,033,968
293.53 4,033,969
293.61 4,033,970
293.72 4,033,971
294.8 D 4,033,972
295 F 4,033,973
295.5 R 4,033,974
296 R 4,033,975
299 4,033,976
302 F 4,033,977
306.7 C 4,033,979
306.7 R 4,033,978
314.5 4,033,980
327 H 4,033,982
327 M 4,033,981
340.6 4,033,984
340.9 4,033,985
345.2 4,033,986
346.4 4,033,987
397.4 4,033,988
408 4,033,989
429 R 4,034,037
448.2 B 4,033,990
448.2 E 4,033,991
456 R 4,033,992
462 R 4,034,038
463 4,033,993
4,033,997
468 R 4,033,994
468.5 4,033,995
471 C 4,033,998
488 CD 4,033,999
490 4,033,996
502.6 4,034,000
513 N 4,034,001
514 D 4,034,002
4,034,003
515 P 4,034,005
515 R 4,034,004
521 C 4,034,006
524 R 4,034,007
533 N 4,034,008
553 A 4,034,009
564 R 4,034,010
570 D 4,034,039
570 R 4,034,011
570.9 4,034,040
571 4,034,041
576 4,034,042
578 4,034,043
586 R 4,034,044
590 FB 4,034,045
607 B 4,034,046
610 B 4,034,047
621 H 4,034,048
622 R 4,034,050
652.5 R 4,034,051
658 R 4,034,049
671 C 4,034,052
672 T 4,034,053
828 4,034,012
835 4,034,013
837 R 4,034,014
857 PG 4,034,015
858 4,034,016
859 R 4,034,017
860 4,034,018
4,034,019
878 R 4,033,939
880 R 4,034,020
887 4,034,021
955 4,034,022
973 4,034,023
981 4,034,024

CLASS 261

18 A 4,034,025
23 A 4,034,026
41 R 4,034,028
44 R 4,034,029
64 D 4,034,030

CLASS 264

25 4,034,031
28 4,034,032
32 4,034,027
36 4,034,033
39 4,034,034
45.9 4,033,929
77 4,034,035
89 4,034,036
93 4,034,054
95 4,034,055
281 4,034,056
297 4,034,057

CLASS 266

50 4,033,558
122 4,033,559
193 4,033,561
204 4,033,563
216 4,033,562
242 4,033,564
273 4,033,565

CLASS 267

126 4,033,566
151 4,033,567

CLASS 269

26 4,033,568
4,033,569
41 4,033,570
315 4,033,571
320 4,033,572

CLASS 270

30 4,033,573

CLASS 271

3 4,033,574
4,033,575
5 4,033,576
128 4,033,577
157 4,033,578
195 4,033,579

CLASS 272

137 4,033,580

CLASS 273

55 B 4,033,581
73 D 4,033,582
73 R 4,033,583
85 A 4,033,584
120 R 4,033,585
131 K 4,033,586
134 CH 4,033,587
138 A 4,033,588
148 R 4,033,589
149 R 4,033,590

CLASS 274

23 R 4,033,591
38 4,033,592

CLASS 277

212 F 4,033,593

CLASS 280

5.22 4,033,595
11.2 4,033,596
46 4,033,597
63 4,033,598
154.5 R 4,033,599
414 R 4,033,600
490 R 4,033,601
605 4,033,602
618 4,033,603
628 4,033,604
664 4,033,605
682 4,033,606
711 4,033,607
4,033,608
718 4,033,609
737 4,033,610

CLASS 283

6 4,033,611

CLASS 285

149 4,033,612
184 4,033,613
248 4,033,614
333 4,033,615

CLASS 290

53 4,034,231

CLASS 292

216 4,033,616

CLASS 294

19 R 4,033,618

CLASS 296

21 4,033,619
24 C 4,033,620
137 B 4,033,621

CLASS 297

250 4,033,622
389 4,033,594
390 4,033,623
434 4,033,624

CLASS 298

22 R 4,033,625

CLASS 299

1 4,033,626

CLASS 301

111 4,033,627

CLASS 302

34 4,033,628

CLASS 303

2 4,033,629
7 4,033,630
50 4,033,631
74 4,033,632
97 4,033,633
103 4,033,634
109 4,033,635
114 4,033,636
115 4,033,637
116 4,033,638

CLASS 307

32 4,034,232
41 4,034,233
116 4,034,234
117 4,034,235
221 C 4,034,238
238 4,034,239
252 F 4,034,240
261 4,034,236
264 4,034,241
268 4,034,237
269 4,034,242
304 4,034,243

CLASS 308

3.6 4,033,639
4 A 4,033,640
15 4,033,641
26 4,033,642
187.2 4,033,643
207 A 4,033,644
4,033,645
218 4,033,646
227 4,033,647

CLASS 310

8.2 4,034,244
52 4,034,245
81 4,034,246
164 4,034,247
178 4,034,248
253 4,034,249

CLASS 312

100 4,033,648
201 4,033,649
206 4,033,650
237 4,033,651
245 4,033,652
253 4,033,653

CLASS 313

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6	:	244,897			244,937		244,911	26 :	244,892	36 :	244,891	41 :	244,889
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		244,900			244,946	18 :	244,890		244,962		244,910		244,913
		244,908			244,948		244,940	27 :	244,902		244,930		244,929
		244,909			244,965	25 :	244,950	29 :	244,903		244,931	42 :	244,887
		244,917	8	:	244,688		244,951	31 :	244,918		244,958		244,904
		244,920			244,935		244,952	34 :	244,919	39 :	244,907		244,944
		244,927			244,939		244,953		244,936		244,949	51 :	244,915
		244,928	9	:	244,945		244,954		244,947		244,957	53 :	244,924
		244,934	17	:	244,886		244,955		244,959				

PLANT PATENTS

6	:	4,070			4,071		4,072		4,073		

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

2	:	T960,001	26	:	T960,002	47	:	T960,004			

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U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner